NAVSHIPS 0967-269-4010

TECHNICAL MANUAL

for

ANTENNA GROUP AN/SRA-43

DEPARTMENT OF THE NAVY

NAVAL SHIP SYSTEMS COMMAND

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Approved: 7 July 1967

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
Title Page	Original	3-0 to 3-1, 3-2	Original
ii to v	Original	4-1 to 4-13	Original
1-0 to 1-5	Original	5-0 to 5-4	Original
2-0 to 2-9	Original	6-1 to 6-5, 6-6	Original

PARZEN RESEARCH, INC., WESTBURY, NEW YORK

Contract: N00024-67-C-1068

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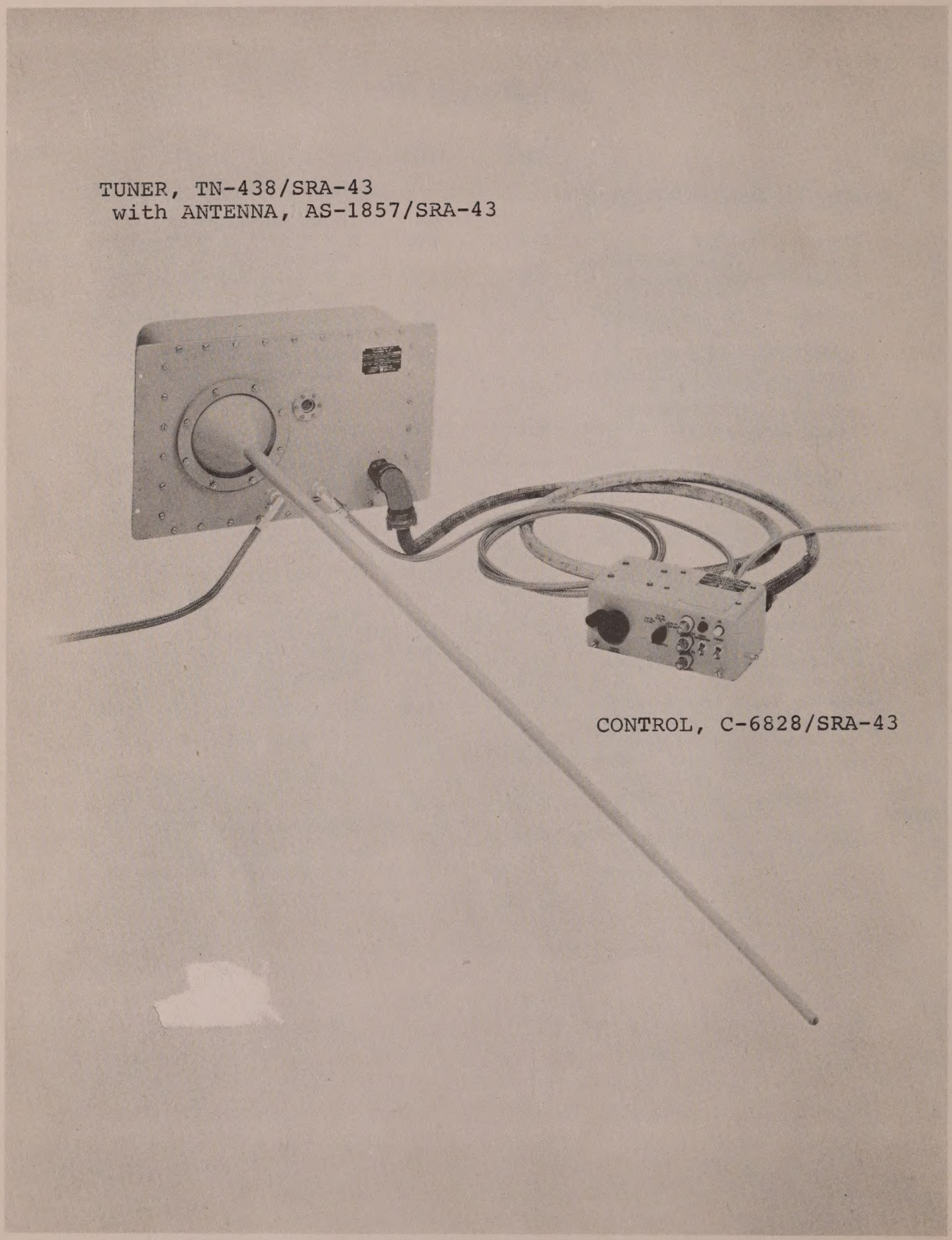


Figure 1-1. Antenna Group AN/SRA-43

SECTION 1

GENERAL INFORMATION

1-1. SCOPE.

This technical manual provides installation, operation, trouble shooting, and repair instructions for Antenna Group AN/SRA-43, which is shown in figure 1-1.

This technical manual is in effect upon receipt. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

1-2. GENERAL DESCRIPTION.

Antenna Group AN/SRA-43 (see figure 1-1) is a shipboard antenna and remotely-controlled preselector covering the 2 to 8 mc frequency range. The Antenna Group is designed to be used with any communications receiver operating in this frequency range.

The Antenna Group rejects undesired signals outside its passband, presents an extremely small parasitic aperture to other antennas in the area, protects the connected receiver against damage from strong local signals over the operating range (including the frequency to which its passband is tuned), provides additional image rejection for the receiver, and reduces spurious radiation from the receiver.

Each Antenna Group consists of the following three units:

a. Antenna AS-1857/SRA-43.

b. Radio Frequency Tuner TN-438/SRA-43.

c. Antenna Control C-6828/SRA-43.

The Antenna is a short whip, which is tuned by the R. F. Tuner. The Tuner is remotely controlled by the Antenna Control unit. The Antenna and the R. F. Tuner are supplied as a combined watertight equipment designed for installation in an exposed area aboard ship. The Antenna Control is a separate dripproof unit intended for installation in a housed and heated space near the connected receiver. The Antenna Group does not include the receiver, the interconnecting cables, nor any brackets or other supporting structure that may be needed to mount the combined Antenna and R. F. Tuner equipment.

The complete antenna system consists of a grounded vertical structure on which the tuned whip is horizontally mounted. The grounded vertical structure is actually the antenna, and each tuned whip is the means of coupling between the antenna and one receiver. Each complete antenna system is tunable over the entire 2 to 8 mc frequency range. Antenna system performance is a function of the height of the vertical structure and of the actual mounting location.

1-3. DESCRIPTION OF UNITS.

a. ANTENNA. (See figure 1-2.) The Antenna unit is a one-section whip antenna of fiberglass construction. A 10 gauge half-hard beryllium copper rod, supported within the fiberglass enclosure, is the conducting element. Its over-all length is 5 feet from the outer surface of the R. F. Tuner. The

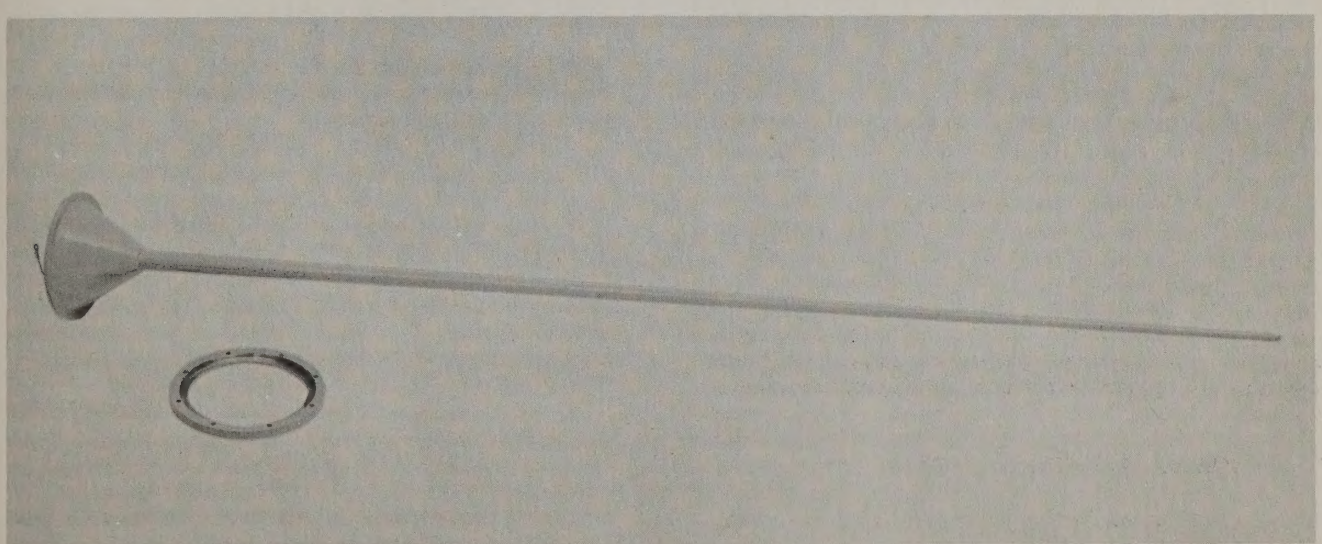


Figure 1-2. Antenna AS-1857/SRA-43 and Antenna Retaining Ring

rigid fiberglass enclosure tapers from approximately 3/8 inch in diameter at the end to approximately 1 inch at the cone-shaped base. The base increases from approximately 1-1/4 inches in diameter to approximately 5-1/2 inches above the mounting lip. The mounting lip is approximately 6-1/2 inches in diameter and 1/4 inch thick. The Antenna unit is secured on the R. F. Tuner by means of an antenna retaining ring, which is bolted into place. The antenna compresses an O-ring in the cover of the Tuner in order to maintain the watertight integrity of the combined Antenna and R. F. Tuner equipment.

b. RADIO FREQUENCY TUNER. (See figure 1-3.) The R. F. Tuner unit consists essentially of three coils, a dual-section variable capacitor, fixed capacitors, a solenoid-operated stepping switch, and a synchro motor with a speed reducer. The remotely controlled stepping switch selects various combinations of capacitance and inductance for each of three frequency bands. The remotely driven synchro positions the variable capacitor to achieve precise tuning within each frequency band. A connection is provided for coupling low-level random noise into the unit in order to permit tuning in the absence of external signal. All operator controls and indicators are on the Antenna Control unit.

The subassemblies and major components, including connectors, are mounted on the R. F. Tuner chassis, which is an aluminum alloy plate. This plate serves as both the front cover and base plate for the unit. The chassis is bolted directly to the mounting brackets or structure. The components are covered by a watertight aluminum alloy housing (cover) fitted with a combination rubber and braided wire flange gasket. In addition to providing a water seal, this gasket grounds the housing and effects radio frequency shielding.

An indicating type of desiccant is placed in a container which is visible through a plexiglass window in the front cover plate of the R. F. Tuner. The silica gel desiccant not only absorbs small amounts of moisture but also indicates the relative humidity inside the equipment.

c. ANTENNA CONTROL. (See figure 1-4.) The Antenna Control unit consists essentially of all the operator controls and indicators for the Antenna Group and of the components necessary for remote control of frequency band selection and tuning, and for random noise generation. The Antenna Control also accepts nominal 115 volt, single phase, 60 cps power, and provides ac power for the synchro system and dc power for the stepping switch solenoid and the noise generation circuit. The unit has a dripproof housing, which fits over a mounting base. Both the housing and the base are fabricated from aluminum alloy.

1-4. REFERENCE DATA.

a. FREQUENCY RANGE: 2 to 8 mc, subdivided into three bands:

(1) Band I: 2.0 to 3.5 mc.
(2) Band II: 3.5 to 5.25 mc.
(3) Band III: 5.25 to 8.0 mc.

b. BANDWIDTH (maximum) at geometric mean frequency:

(1) Band I: 19 kc at 2.65 mc.
(2) Band II: 28 kc at 4.3 mc.
(3) Band III: 38 kc at 6.5 mc.

The bandwidth is the loaded 3 db bandwidth of the Tuner with the R. F. output (receiver output) terminated by 50 ohms and the Antenna replaced by a dummy antenna consisting of a 10 pf capacitor in series with the following resistors:

Band I: 3.3 ohms (three 10 ohm resistors in parallel).
Band II: 17.8 ohms.
Band III: 121 ohms.

c. LOSS VALUE at geometric mean frequency:

(1) Band I: 17 $\pm$ 1.5 db at 2.65 mc.
(2) Band II: 14.5 $\pm$ 1.5 db at 4.3 mc.
(3) Band III: 9.3 $\pm$ 1.5 db at 6.5 mc.

The loss value is a measure of the efficiency of the R. F. Tuner and is the ratio (expressed in db) of the power at the R. F. output connector to the power dissipated in the resistor of the dummy antenna described in paragraph b. above.

d. R. F. OUTPUT IMPEDANCE at geometric mean frequency in each band: Voltage standing wave ratio (VSWR) of less than 1.17 referred to 50 ohms.

e. TYPE OF TUNING: Variable capacitance.

f. TYPE OF REMOTE CONTROL: Synchro (selsyn) system.

g. OVER-ALL BACKLASH: $\pm 5^\circ$ maximum.

h. RANDOM NOISE LEVEL: 22 to 30 db above kT (thermal noise) at the receiver; adjustable in Antenna Control unit.

i. OPERATING TEMPERATURE:

(1) Antenna and R. F. Tuner: -28° C (-18° F) to +65° C (+149° F).
(2) Antenna Control: 0° C (+32° F) to +50° C (+122° F).

j. NON-OPERATING TEMPERATURE:

-62° C (-80° F) to +75° C (+167° F).

k. POWER REQUIRED:

115 $\pm$ 12 volts, single phase, 60 $\pm$ 3 cps, 100 volt-amperes or 15 watts maximum.

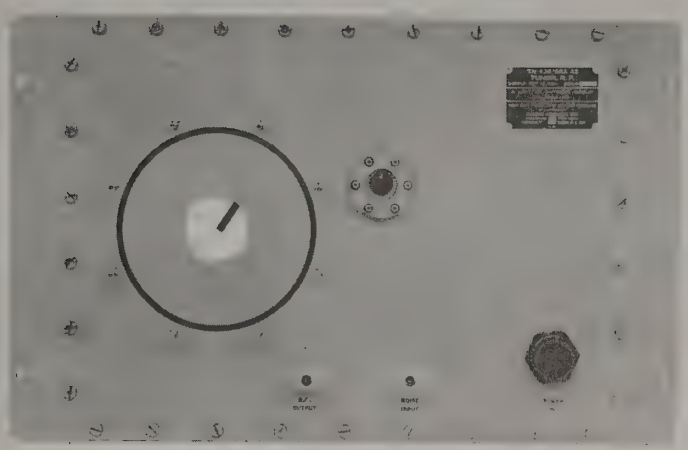


Figure 1-3. Radio Frequency Tuner TN-438/SRA-43

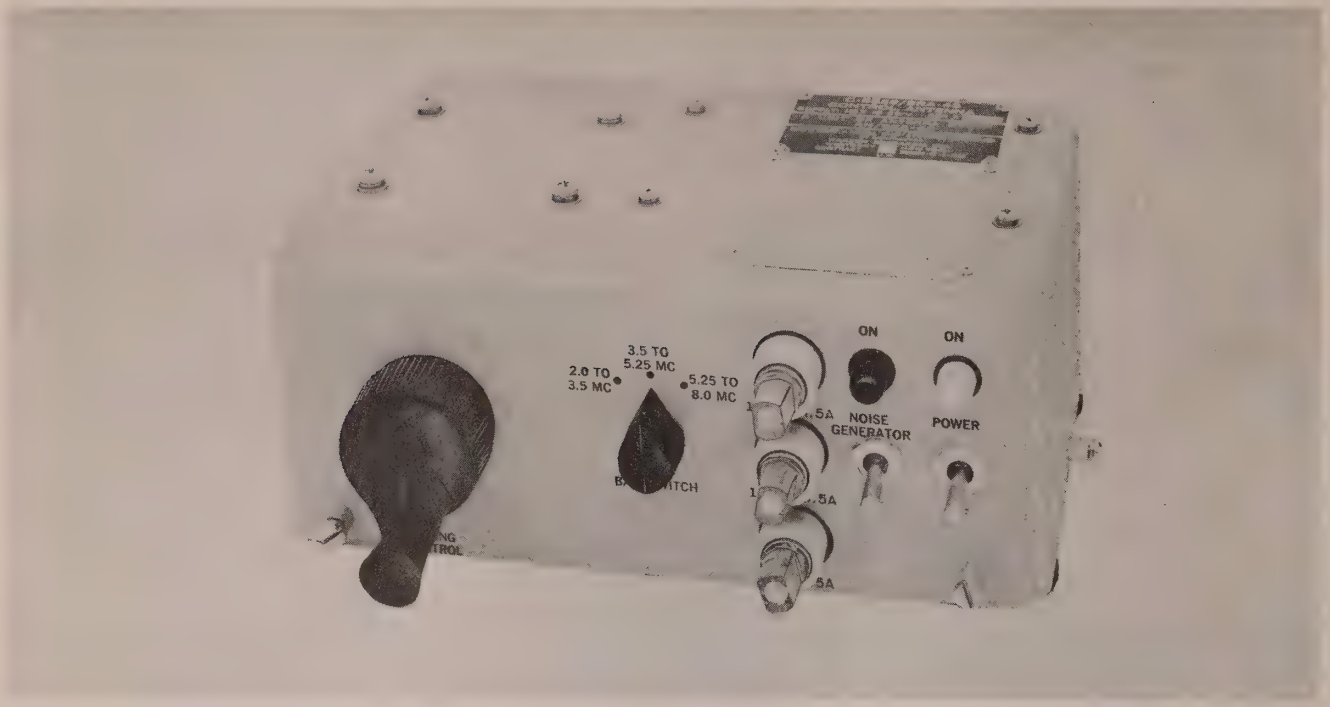


Figure 1-4. Antenna Control C-6828/SRA-43

1-5. EQUIPMENT SUPPLIED.

The dimensions and weights of all units of Antenna Group AN/SRA-43 are listed in table 1-1. The table also lists the mating connectors and the technical manual supplied with the equipment.

1-6. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

Table 1-2 lists equipments required but not supplied for trouble shooting the Antenna Group.

TABLE 1-1. EQUIPMENT SUPPLIED

QTY PER EQUIP.	NOMENCLATURE		OVER-ALL DIMENSIONS (IN.)			VOLUME CU. FT.)	WEIGHT (LB.)	REMARKS
	DESIGNATION	NAME	HEIGHT	WIDTH	DEPTH			
1	AS-1857/SRA-43	ANTENNA	LENGTH:		60.0	0.06	2.5	See figures 1-2 and 2-3.
1	TN-438/SRA-43	TUNER, RADIO FREQUENCY	13.0	21.0	6.4	0.95	30.0	
(1)	COMBINED EQUIPMENT	ANTENNA AND R. F. TUNER	13.0	21.0	66.4	1.01	32.5	Supplied as one equipment.
1	C-6828/SRA-43	CONTROL, ANTENNA	4.2	9.7	6.0	0.14	8.0	
1	MS3116F-12-3S (P1)	CONNECTOR, MS TYPE, 3 CONTACTS, FEMALE PLUG						FITS TSGA-3 CABLE
1	CN14314 (P2)	CONNECTOR, MS TYPE, 16 CONTACTS, MALE PLUG, STRAIGHT						FITS TTRSA-8 OR TTRSA-16 CABLE

TABLE 1-1. EQUIPMENT SUPPLIED (Cont)

QTY PER EQUIP.	NOMENCLATURE		OVER-ALL DIMENSIONS (IN.)			VOLUME (CU. FT.)	WEIGHT (LB.)	REMARKS
	DESIGNATION	NAME	HEIGHT	WIDTH	DEPTH			
1	SL14399 (MP2)	SLEEVE						FOR P2 (USE IS OPTIONAL)
1	CN14315 (P3)	CONNECTOR, MS TYPE, 16 CONTACTS, FEMALE PLUG, RIGHT ANGLE, WATERTIGHT						FITS TTRSA-8 OR TTRSA-16 CABLE
1	AN3420-20A (MP1)	SLEEVE						FOR P3 (USE IS OPTIONAL)
1	UG-941B/U (P4)	CONNECTOR, TYPE N, STRAIGHT						FITS RG-215/U CABLE
2	CN14316 (P5 and P6)	CONNECTOR, TYPE N, PLUG, RIGHT ANGLE, WATERTIGHT						FITS RG-215/U CABLE
2	TECHNICAL MANUAL FOR ANTENNA GROUP AN/SRA-43	NAVSHIPS 0967-269-4010	11.0	8.5	0.3			

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED FOR TROUBLE SHOOTING

QTY PER EQUIP.	NOMENCLATURE		REQUIRED	REQUIRED
	NAME	DESIGNATION	USE	CHARACTERISTICS
1	Signal Generator (Test Oscillator)	AN/URM-250	R. F. Signal Source	2 to 8 mc
1	Electronic Voltmeter	AN/USM-116	R. F. Voltage	2 to 8 mc, 10 mv to 1 volt full scale
1	Voltage Standing Wave Ratio (VSWR) Meter	AN/URM-120	Output VSWR (Impedance)	2 to 8 mc
1	Volt-Ohm-Milliammeter	AN/PSM-4( )	Dc Voltage, AC (Power) Voltage, and DC Resistance	10, 50, and 250 volts dc full scale (20,000 ohms per volt) 250 volts ac full scale (5,000 ohms per volt) 0-200 kilohms dc
1	Dummy Antenna	Parzen Research AT14041, or fabricated	Output VSWR (Impedance)	10 pf ±5% capacitor in series with 3.3 ±1%, 17.8 ±1%, or 121 ±1% ohm carbon film resistor

SECTION 2

INSTALLATION

2-1. UNPACKING AND HANDLING.

a. Observe the usual precautions when unpacking electronic equipment.

b. Use appropriate tools to open the packing container.

c. Remove all loose cushioning and filler material.

d. Carefully remove the equipment from the container, and brush off any foreign matter.

e. Visually inspect the equipment for any evidence of damage. In the event that damage is suspected, open the R. F. Tuner and the Antenna Control enclosures and make repairs if necessary. Ordinarily it is not necessary to remove the Tuner housing prior to installation.

f. Operate all control knobs and switches, and note smoothness of operation.

g. Check connectors for electrical fitness.

h. Using table 1-1 as a check list, make certain that all equipment is received.

2-2. POWER REQUIREMENTS.

Antenna Group AN/SRA-43 requires 115 ± 12 volts, single phase, 60 ± 3 cps, 100 volt-amperes or 15 watts maximum. This primary power is supplied to the Antenna Control unit as shown in figure 2-1.

In the event that 400 cps power must be used in an installation, the synchros must be changed from types 31TX6b and 31TR6b to types 31TX4b and 31TR4b.

2-3. SITE SELECTION.

Appropriate locations aboard ship will be determined by the Naval Ship Engineering Center. It should be noted that Antenna performance depends on its effective height above the ground plane and on its position in relation to other structures.

2-4. INSTALLATION REQUIREMENTS.

Pictorial system and interconnecting wiring and cabling diagrams are shown in figure 2-2. Installation materials required are listed in table 2-1.

a. ANTENNA. (See figures 2-2 and 2-3.) The Antenna is supplied mounted on the R. F. Tuner. It should not require removal prior to installation except in the event of damage. For removal and replacement instructions, refer to Section 5.

b. RADIO FREQUENCY TUNER. (See figure 2-4.) The combined Antenna and R. F. Tuner equipment is mounted by means of four 3/8 inch bolts through the Tuner chassis CH14618 (front cover plate) and the supporting structure, as shown in figures 2-2 and 2-4.

c. ANTENNA CONTROL. (See figures 2-5 and 2-6.) This unit is mounted by means of four 10-32 binding head screws inserted through the mounting holes in the base. The procedure is as follows:

(1) Loosen and disengage the six captive screws near the bottom of the unit.

(2) Lift the Antenna Control unit housing HS14859 off of the base BA14861. All subassemblies and components are mounted in the housing, which is the top of the unit.

(3) Using the base as a template, drill four holes 1/4 inch in diameter through the mounting surface.

(4) Install four each 10-32 screws, flat washers, lock washers, and nuts, thus securing the base.

(5) Replace the housing on the base, and tighten the six captive screws.

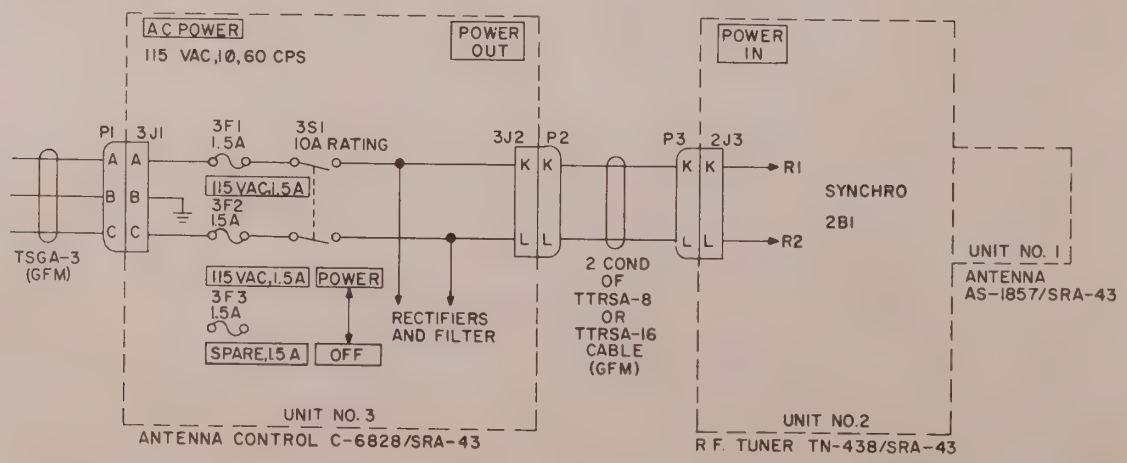


Figure 2-1. Antenna Group AN/SRA-43, Primary Power Distribution Diagram

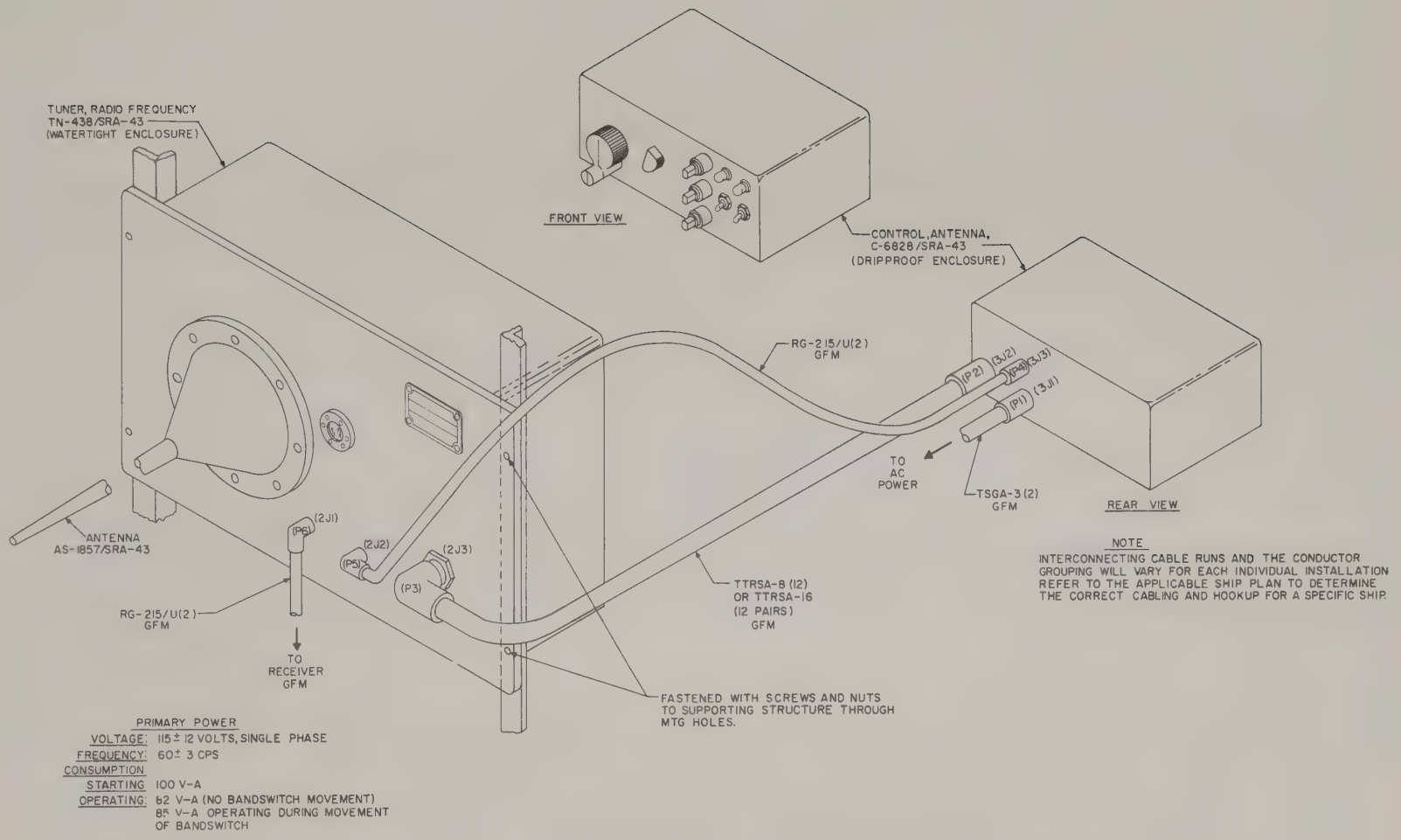


Figure 2-2. Antenna Group AN/SRA-43, Pictorial System Diagram and Interconnecting Wiring and Cabling Diagram

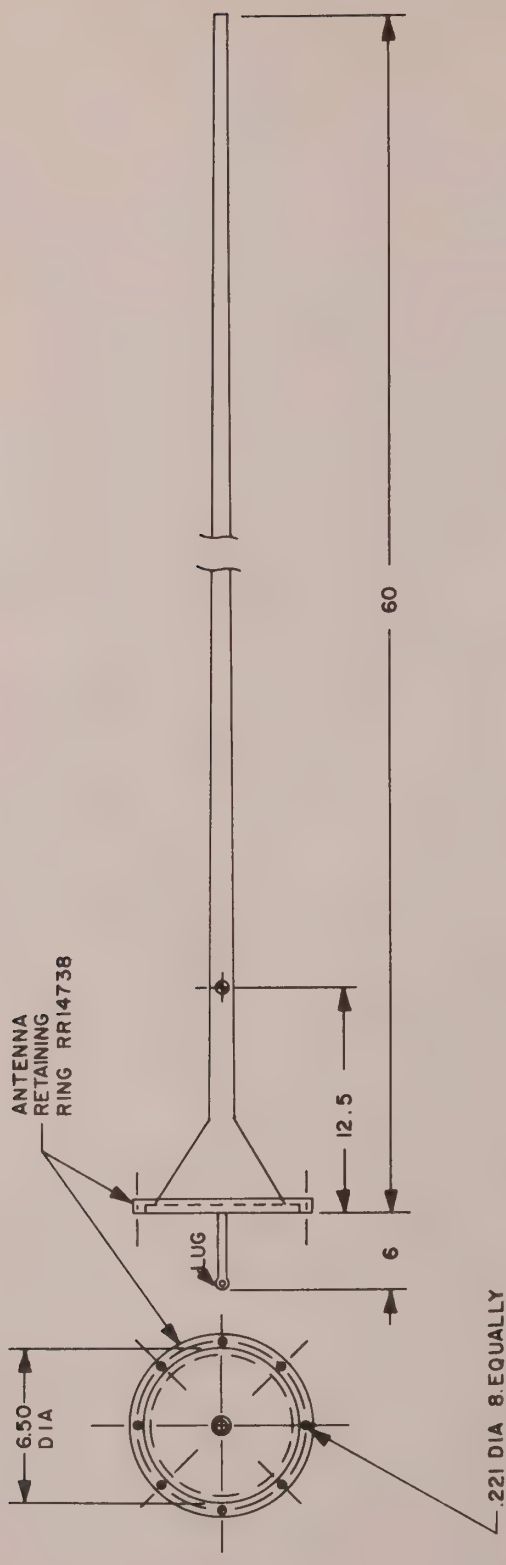


Figure 2-3. Antenna AS-1857/SRA-43, Outline and Mounting Dimensions

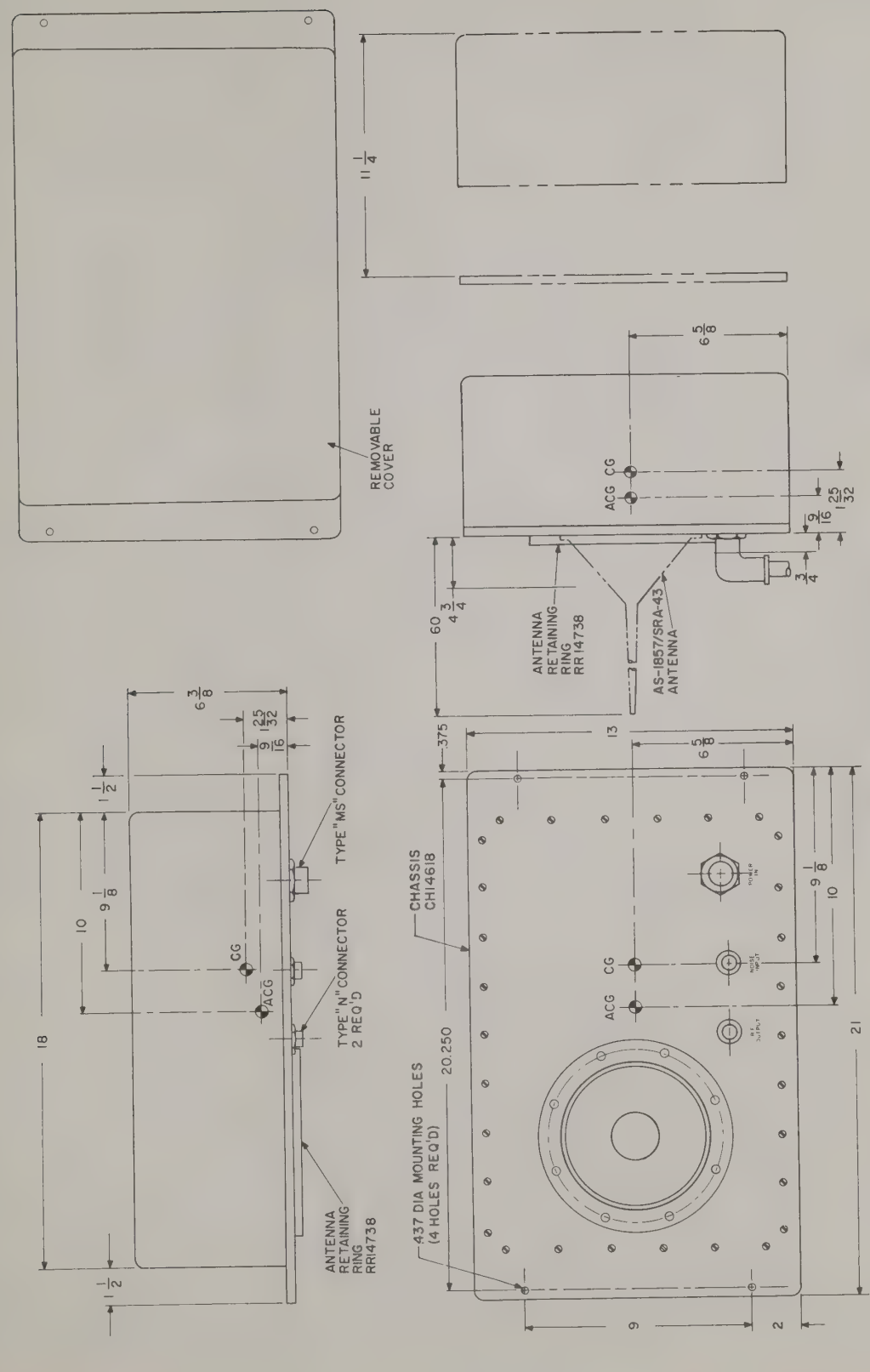
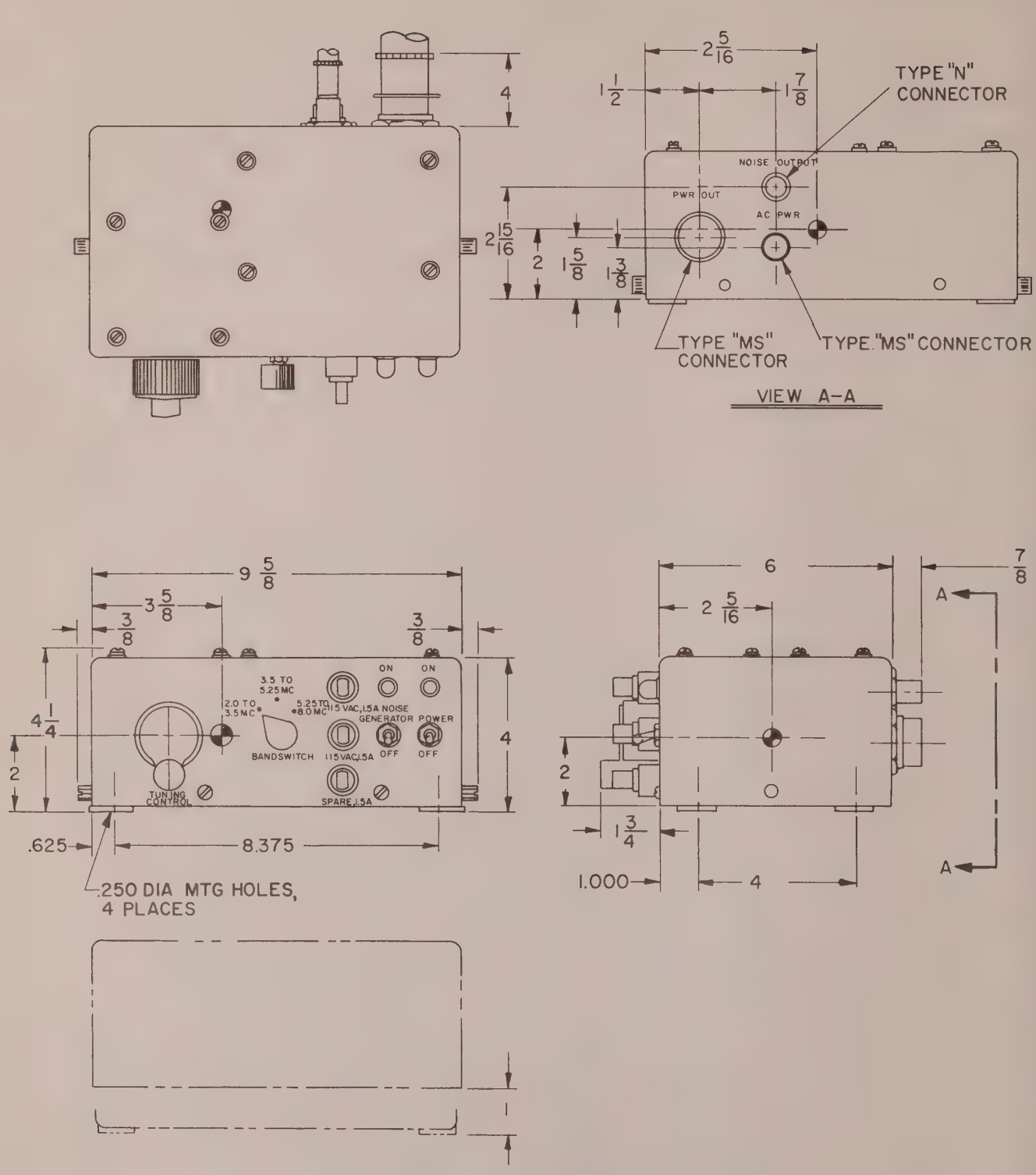


Figure 2-4. Radio Frequency Tuner TN-438/SRA-43, Outline and Mounting Dimensions



PKG'D DIMENSIONS: 11X12X6 IN
WEIGHT: 8 LB.
PKG'D WEIGHT 17LB.
HEAT DIS: NEGLIGIBLE
AMBIENT TEMP: 0°C TO + 50°C OPERATING
−62°C TO + 75°C NON-OPERATING

Figure 2-5. Antenna Control C-6828/SRA-43, Outline and Mounting Dimensions

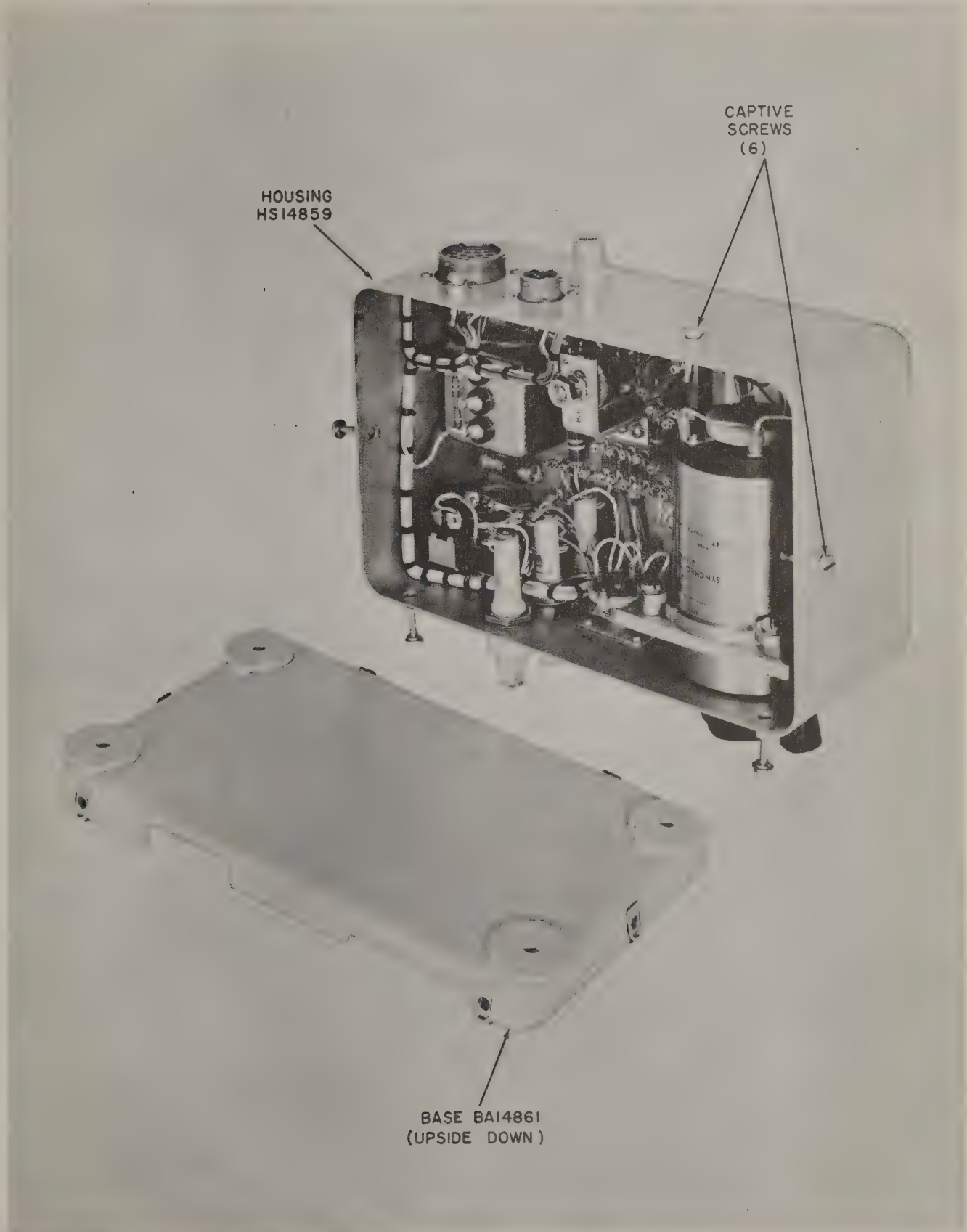


Figure 2-6. Antenna Control Housing and Base

TABLE 2-1. ANTENNA GROUP AN/SRA-43, SUMMARY LIST OF INSTALLATION MATERIALS

ITEM NUMBER	QUANTITY GF	QUANTITY CF	NOMENCLATURE	PART, TYPE OR MODEL NUMBER	MANUFACTURER'S NAME OR FED. SUPPLY CODE	REMARKS
1		1	ANTENNA	AS-1857/SRA-43	21693	
2		1	TUNER, RADIO FREQUENCY	TN-438/SRA-43	21693	
3		1	CONTROL, ANTENNA	C-6828/SRA-43	21693	
4		1	CONNECTOR, MS TYPE, 3 CONTACTS, FEMALE PLUG	MS3116F-12-3S (P1)	21693	FITS TSGA-3 CABLE
5		1	CONNECTOR, MS TYPE, 16 CONTACTS, MALE PLUG STRAIGHT	CN14314 (P2)	21693	FITS TTSRA-8 OR TTRSA-16 CABLE
6		1	SLEEVE	SL14399 (MP2)	21693	FOR P2 (USE IS OPTIONAL)
7		1	CONNECTOR, MS TYPE, 16 CONTACTS, FEMALE PLUG, RIGHT ANGLE, WATERTIGHT	CN14315 (P3)	21693	FITS TTRSA-8 OR TTRSA-16 CABLE
8		1	SLEEVE	AN3420-20A (MP1)	-	FOR P3 (USE IS OPTIONAL)
9		1	CONNECTOR, TYPE N, STRAIGHT	UG-941B/U	-	FITS RG-215/U CABLE
10		2	CONNECTOR, TYPE N, PLUG, RIGHT ANGLE WATERTIGHT	CN14316 (P5 and P6)	21693	FITS RG-215/U CABLE
11	AR		CABLE	TSGA-3		
12	AR		CABLE	TTRSA-8 or TTRSA-16		
13	AR		CABLE	RG-215/U		
14	4		3/8 IN. SCREW	-		FOR MOUNTING TUNER; LENGTH VARIES
15	4		3/8 IN. NUT	-		
16	4		3/8 IN. (3/4 O.D.) FLAT WASHER	-		
17	4		3/8 IN. LOCK WASHER	-		
18	4		10-32 SCREW	-		FOR MOUNTING CONTROL; LENGTH VARIES
19	4		10-32 NUT	-		
20	4		10 FLAT WASHER	-		
21	4		10 LOCK WASHER	-		

d. CABLING. (See figures 2-7 and 2-8.) Mating connectors but not interconnecting cables are supplied with this equipment. Table 2-2 is the cable running sheet. Lengths of the cables will be determined by the individual ship installation plan. The mating connectors and adapters are identified in figure 2-8.

If the distance between the R. F. Tuner and the Antenna Control unit is more than 100 feet, it is recommended that type TTRSA-16 cable be used instead of type TTRSA-8. When type TTRSA-16 is used, both conductors of each of twelve pairs should be attached to the same connector terminals. Rubber sleeves SL14399 and AN3420-20A are provided for optional use with mating connectors P2 and P3. Their use is recommended when the connectors are installed on the smaller-diameter type TTRSA-8 cable.

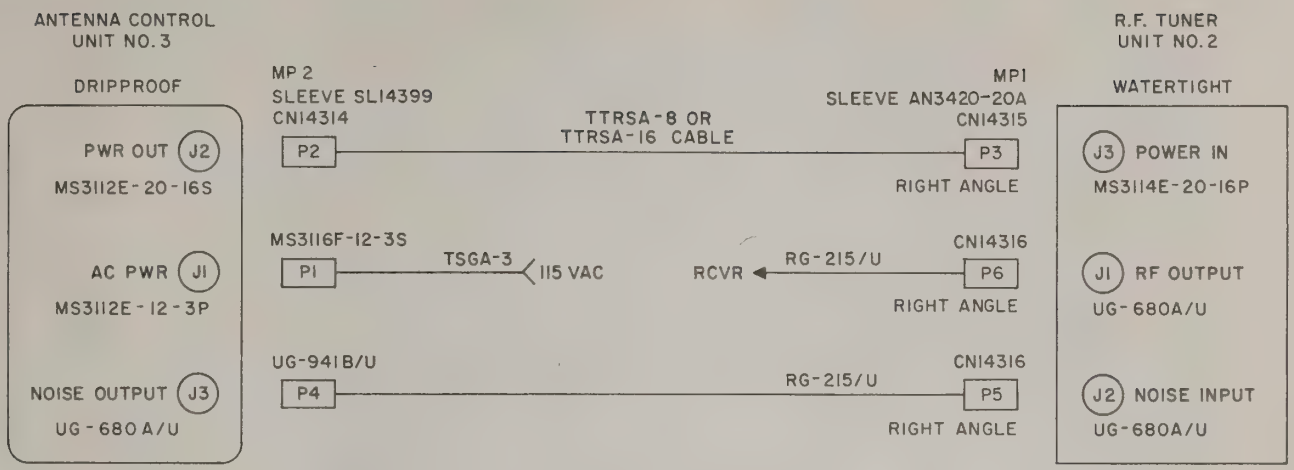


Figure 2-7. Mating Connectors and Interconnecting Cabling Diagram

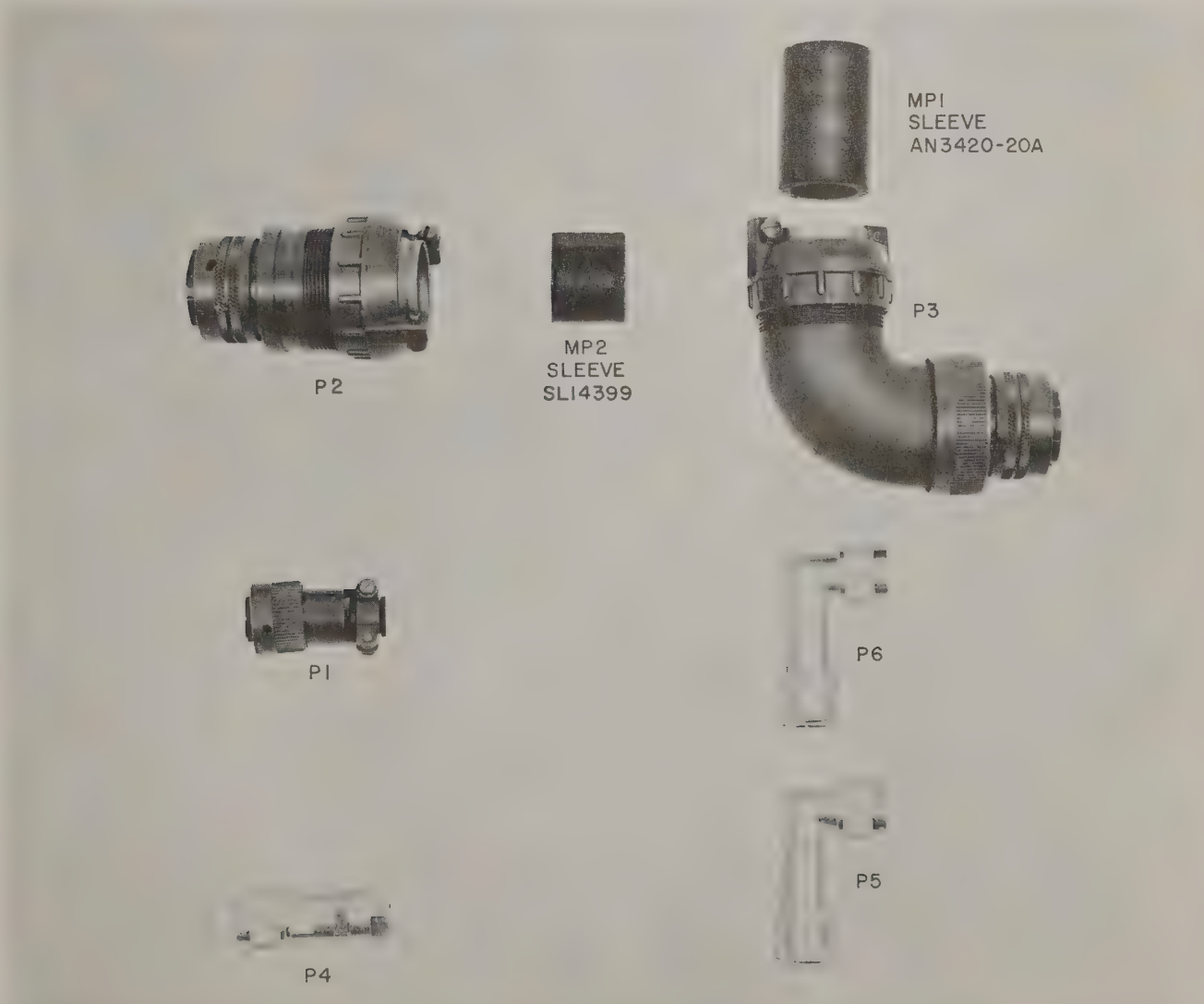


Figure 2-8. Mating Connectors and Adapters

TABLE 2-2. ANTENNA GROUP AN/SRA-43, CABLE RUNNING SHEET

MFGR CODE	NAVY CABLE DESIG-NATION	CABLE TYPE & SIZE	NO. OF ACTIVE CONDS	COLOR CODE	FROM	TERMINAL BOARD, PLUG OR JACK	TERMINAL OR PIN DESIG-NATION	TO	TERMINAL BOARD, PLUG OR JACK	TERMINAL OR PIN DESIG-NATION	FUNCTION	CURRENT IN AMPS	MAX ALLOW VOLT DROP	SUPPLIED BY
	TSGA-3	POWER ARMORED	2		115 VAC SOURCE			C-6828/ SRA-43 CONTROL, ANTENNA (3J1)	MS3116F-12-3S (P1)	A B C	AC POWER GROUND AC POWER	1.5 1.5		GFM
	TTRSA-8	RADIO, TWISTED SHIELD-ED PAIR, ARMORED	12	0 (9)	C6828/ SRA-43 CONTROL, ANTENNA (3J2)	CN14314 (P2)	A	TN-438/ SRA-43 TUNER, R. F. (2J3)	CN14315 (P3)	A	DC CONTROL			GFM
				0 (1)			B			B	DC CONTROL			
				9 (1)			C			C	DC CONTROL			
				0			D			D	GROUND			
				3 (9)			E			E	DC POWER	1		
				3 (1)			F			F	DC POWER	1		
				6 (9)			G			G	SYNCHRO S1			
				6 (1)			H			H	SYNCHRO S2			
				90 (9)			J			J	SYNCHRO S3			
				21 (9)			K			K	SYNCHRO R1	0.5		
				21 (1)			L			L	SYNCHRO R2	0.5		
				9 (9)			M			M	GROUND			
				SPARES:			SPARES:			SPARES:	SPARES:			
				2			N			N	(4)			
							P			P				
				5			Q			Q				
				90 (1)			R			R				
	RG-215/U	R. F. COAXIAL ARMORED	2		TN-438/ SRA-43 TUNER, R. F. (2J1)	CN14316 (P6)		RECEIVER (GFM, NOT PART OF AN/SRA-43)			R.F. OUTPUT			GFM
	RG-215/U	R. F. COAXIAL ARMORED	2		C-6828/ SRA-43 CONTROL, ANTENNA (3J3)	UG-941B/U (P4)		TN-438/ SRA-43 (2J2)	CN14316 (P5)		NOISE GEN-ERATOR			GFM

2-5. INSPECTION AND ADJUSTMENT.

The mounting and cabling should be carefully inspected for workmanship and completeness, and the Antenna Group should be operated in the normal manner (refer to Section 3) to check out the installed equipment.

No adjustment is normally required on installation.

SECTION 3

OPERATION

3-1. FUNCTIONAL OPERATION.

Antenna Group AN/SRA-43 is used to improve the performance and protect any type of communications receiver operating in the frequency range from 2 to 8 mc. The Antenna Control unit is installed near the connected receiver, and the combined Antenna and R. F. Tuner equipment is mounted on a grounded vertical structure in an exposed area of the ship. Radio frequency (R. F.) performance depends on Antenna location and the input impedance of the receiver.

The Antenna Control unit has all the operator controls and indicators for selecting the frequency band and for tuning the R. F. system. It also generates random noise, which permits tuning the equipment in the absence of external signal, and furnishes ac and dc power as well as control signals to the R. F. Tuner. The Antenna is resonated (tuned) by means of a variable capacitor driven through a speed reducer by a synchro motor. Different combinations of variable capacitor sections, fixed capacitors, and coils are switched into the R. F. system to provide proper coupling for the Antenna in each of the three frequency bands.

3-2. SEQUENCE OF OPERATION.

(Figure 3-1 and table 3-1 locate and describe all the controls and indicators.)

a. Flip POWER switch on. Check that the white ON lamp lights.

b. Turn BANDSWITCH to the frequency band of interest. (Be sure that the receiver is tuned to the desired frequency.)

c. If any signal is present at the desired frequency, slowly turn the TUNING CONTROL knob in one (either) direction until the maximum signal is received by the receiver. Peak up the signal.

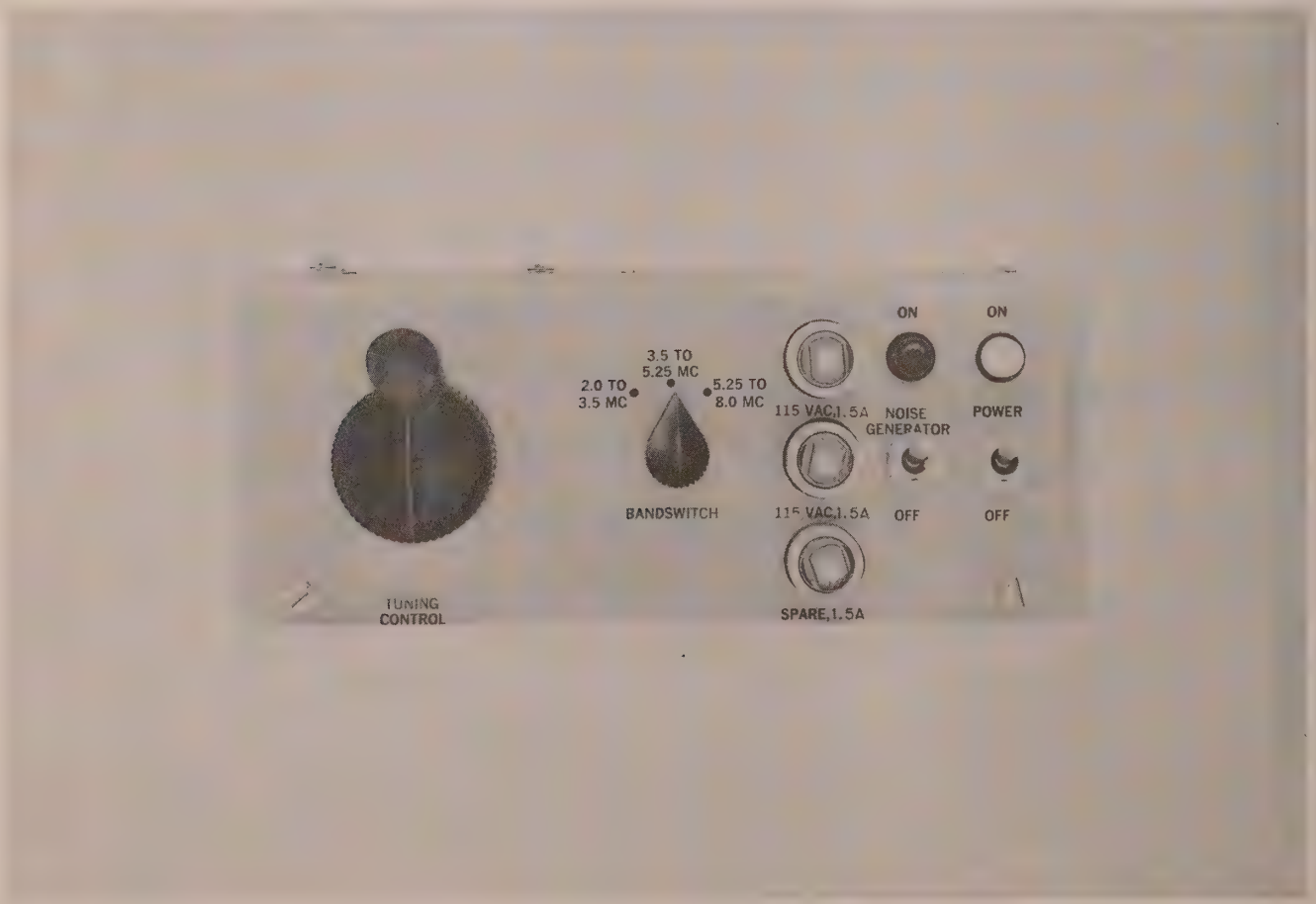


Figure 3-1. Operating Controls on Antenna Control Unit Front Panel

TABLE 3-1. LIST OF CONTROLS AND INDICATORS

CONTROL OR INDICATOR	FUNCTION OR PURPOSE
TUNING CONTROL	Rotates the variable capacitor in the R. F. Tuner for maximum signal strength at the receiver.
BANDSWITCH	Selects the frequency band of operation.
NOISE GENERATOR Switch	Turns on random noise to facilitate tuning when no external signal is present. Turns off random noise for receiving external signal.
ON Lamp (Red)	Lights when NOISE GENERATOR switch is turned on.
POWER Switch	Turns on and off input ac power.
ON Lamp (White)	Lights when ac power is supplied to the equipment and POWER switch is turned on.
115 VAC, 1.5A Blown-Fuse Indicators (2)	Glows when the fuse is open.
SPARE, 1.5A Blown-Fuse Indicator	Contains one spare fuse; does not indicate.

d. If no signal is present at the desired frequency:

(1) Flip NOISE GENERATOR switch on. Check that the red ON lamp lights.

(2) Slowly turn the TUNING CONTROL knob in one direction until maximum noise is received by the receiver. Peak up the signal.

(3) Flip NOISE GENERATOR switch OFF.

Note

Do not leave the NOISE GENERATOR switch turned ON any longer than absolutely necessary. The Antenna will transmit the random noise at a low level, which might interfere with the other receiving systems in the vicinity.

e. Flip POWER switch OFF, unless retuning is expected immediately. The R. F. system is completely passive in operation, and the tuning capacitor (but not the TUNING CONTROL knob) is held in position by the locking action of speed reducer gearing.

3-3. EMERGENCY OPERATION.

There is no method of operation other than those described above.

3-4. OPERATOR'S MAINTENANCE.

There are no special maintenance procedures required of the operator other than checking the blown-fuse indicators and the pilot lamps.

SECTION 4

TROUBLE SHOOTING

4-1. FUNCTIONAL DESCRIPTION.

Antenna Group AN/SRA-43 is a shipboard antenna and remotely-controlled preselector covering the 2 to 8 mc frequency range. The Antenna Group is intended to be used with any communications receiver operating in this frequency range. The equipment consists of Antenna AS-1857/SRA-43, which is supplied mounted on Radio Frequency Tuner TN-438/SRA-43, and Antenna Control C-6828/SRA-43. The combined Antenna and R. F. Tuner equipment is mounted on a grounded vertical structure, and the Antenna Control unit is mounted near the receiver connected to the system. The three interconnected units of the Antenna Group provide all circuitry and controls required to perform the following functions:

a. Select one of the following three frequency bands:

(1) Band I: 2.0 to 3.5 mc.
(2) Band II: 3.5 to 5.25 mc.
(3) Band III: 5.25 to 8.0 mc.

b. Tune to the desired frequency within the selected band.

c. Generate random noise to permit tuning in the absence of external signal.

d. Provide and distribute dc power as required.

e. Accept and distribute ac power.

f. Interconnect the units. (Mating connectors but not interconnecting cables are supplied with this equipment.)

The principles of operation of the Antenna Group are discussed in the paragraphs below on the basis of functional systems rather than units. Figure 4-1 is the over-all schematic and interconnecting wiring diagram.

Note

The unit numbering method of reference designations is employed for this equipment. The first number of a complete reference designation is the unit number, and the second letter and number are the subassembly designation. Complete reference designations are used in this section so that the location of every part is readily apparent. The Antenna is unit no. 1, the R. F. Tuner is unit no. 2, and the Antenna Control is unit no. 3. Subassemblies are designated A1 and A2. For example, complete reference designations for the resistors in the Power Supply and Noise Generator Subassembly (A1) of the Antenna Control (unit no. 3) are 3A1R1, 3A1R2, etc.

a. R. F. SYSTEM. (See figures 4-2, 4-3, 4-4, and 4-5.)

During normal operation, the Antenna conducts energy from the air to the R. F. Tuner, which accepts frequencies in the passband to which it is tuned and rejects all others. The accepted signals are fed to the connected receiver. The tuning network has specified loss values (refer to paragraph 1-4c) at all tuned frequencies in order to protect the receiver from high-power signals emitted in the vicinity of the Antenna.

In the absence of external signal at the desired frequency, random noise generated in the Antenna Control unit can be supplied to the tuning network, as discussed below. The R. F. system operates in exactly the same way with generated noise, ambient noise (atmospheric, spurious, etc.), and signals at the desired frequency.

The R. F. system is basically a tank circuit which resonates with the Antenna at the tuned frequency. As shown in figure 4-2, the R. F. circuit for Band I is a simple conventional tank circuit consisting of variable capacitor 2C1 and fixed inductor 2L1. In this case, the antenna is directly coupled to the tank circuit. Since the series resistance of the relatively short whip Antenna sharply increases as its frequency of operation increases, the coupling for Bands II and III is made "loose". This is accomplished by switching in fixed capacitor 2C4 or 2C3, respectively, and shunt variable capacitor 2C2, whose direction of tuning is opposed to that of the main tuning capacitor, 2C1. In other words, 2C1 is at maximum capacitance when 2C2 is at minimum. The R. F. circuits for Bands II and III both consist of a coupling network and a tank circuit, as shown in figure 4-2.

The main tuning and the shunting auxiliary tuning variable capacitors 2C1-2C2 comprise a dual-section unit which is driven through a speed reducer by synchro 2B1, as discussed in paragraph 4-1c below.

All components of the R. F. system are switched in and out of the circuit by means of solenoid-operated rotary stepping switch 2K1, which is discussed in paragraph 4-1b below. Complete circuit and

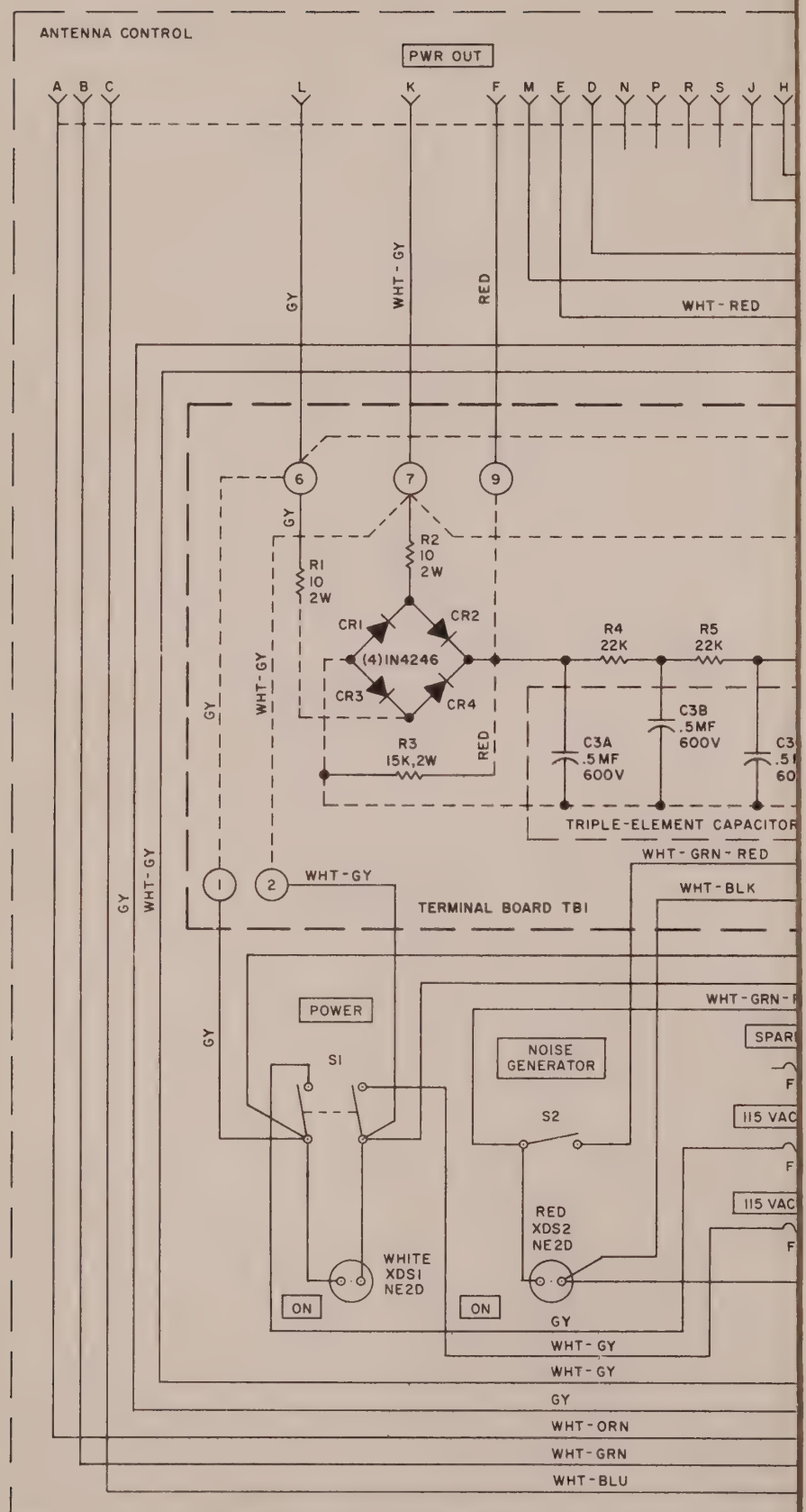


Figure 4-1. Antenna Group AN/SRA-43, Over-All Schem

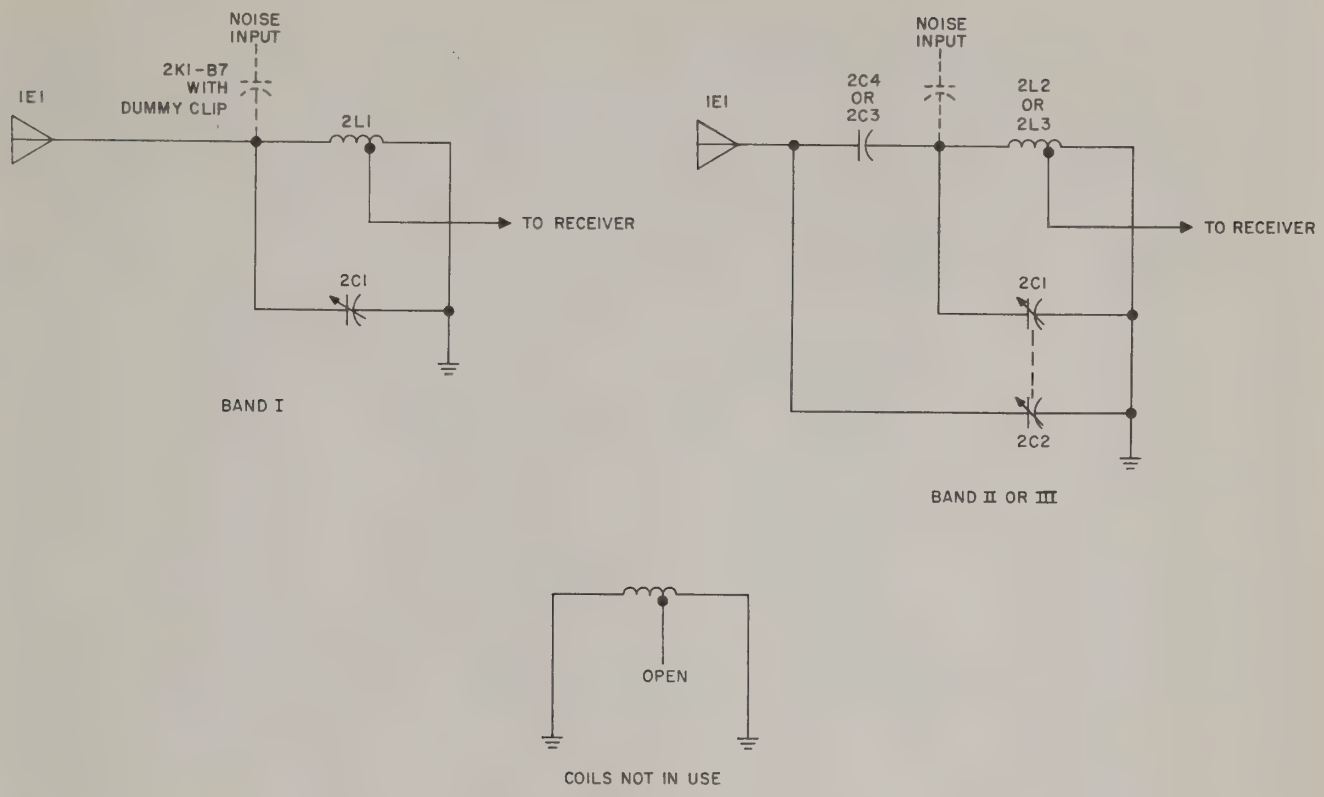


Figure 4-2. R. F. System, Simplified Schematic Diagram

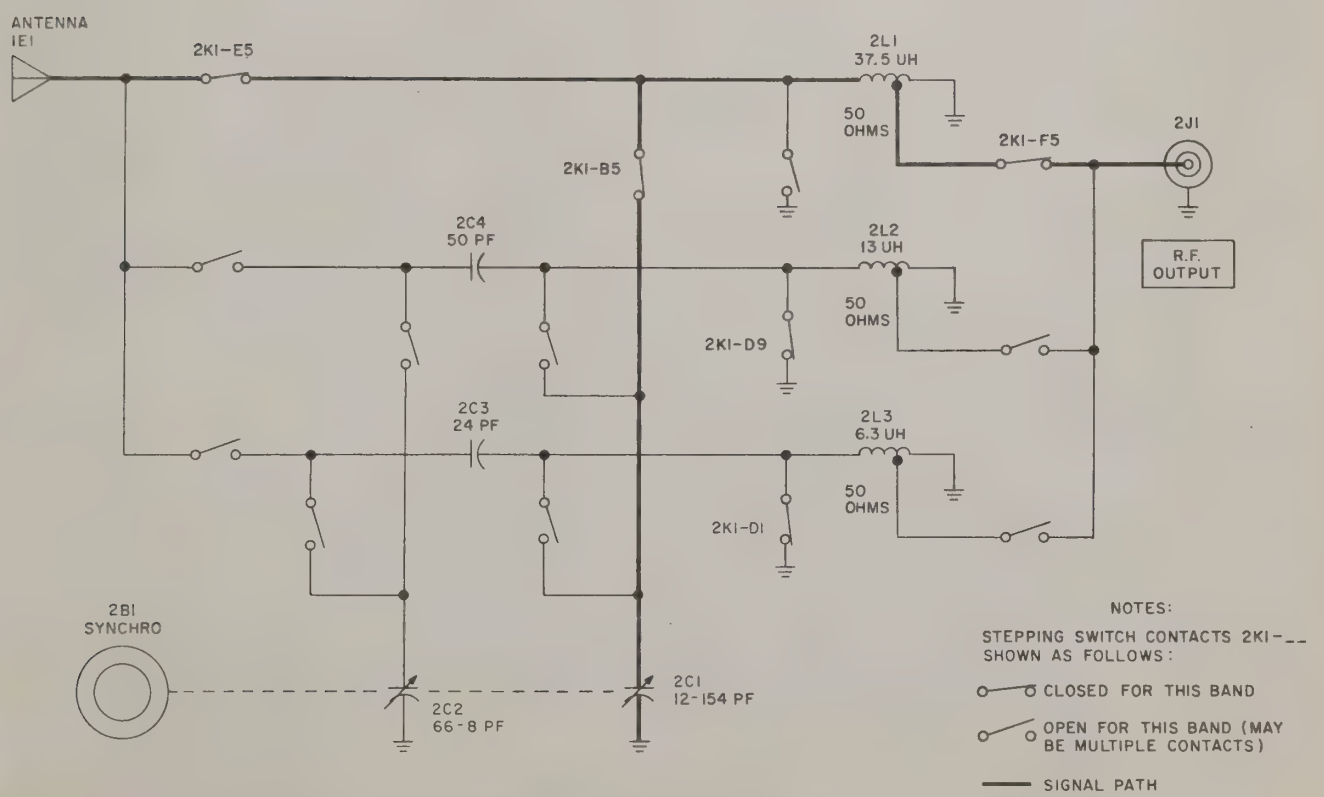
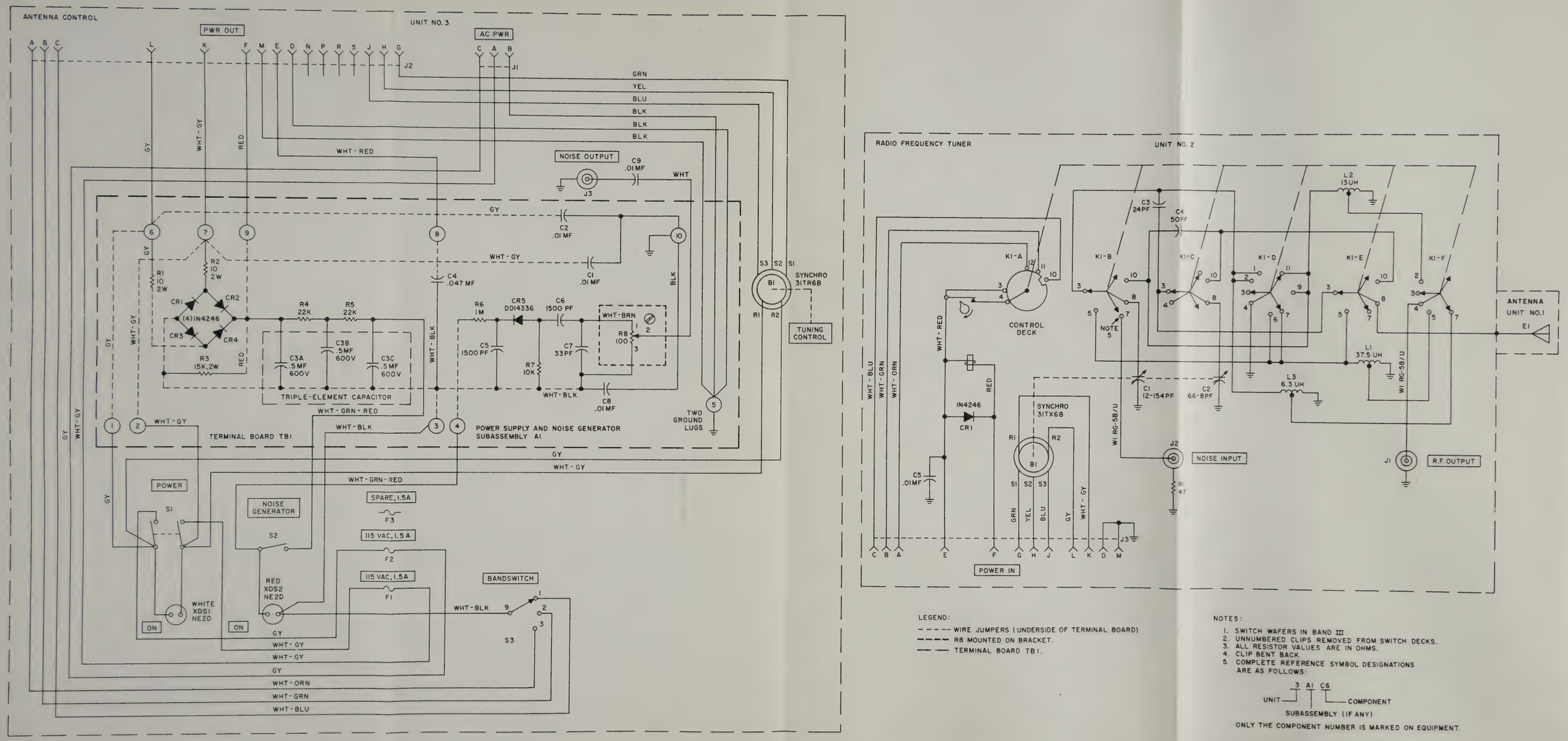


Figure 4-3. R. F. Circuitry for Band I, Schematic Diagram



LEGEND:

- WIRE JUMPERS (UNDERSIDE OF TERMINAL BOARD)
- R8 MOUNTED ON BRACKET.
- TERMINAL BOARD TB1.

NOTES:

1. SWITCH WAFERS IN BAND III.
2. UNNUMBERED CLIPS REMOVED FROM SWITCH DECKS.
3. ALL RESISTOR VALUES ARE IN OHMS.
4. CLIP BENT BACK.
5. COMPLETE REFERENCE SYMBOL DESIGNATIONS ARE AS FOLLOWS:

ONLY THE COMPONENT NUMBER IS MARKED ON EQUIPMENT.

Figure 4-1. Antenna Group AN/SRA-43, Over-All Schematic Wiring Diagram

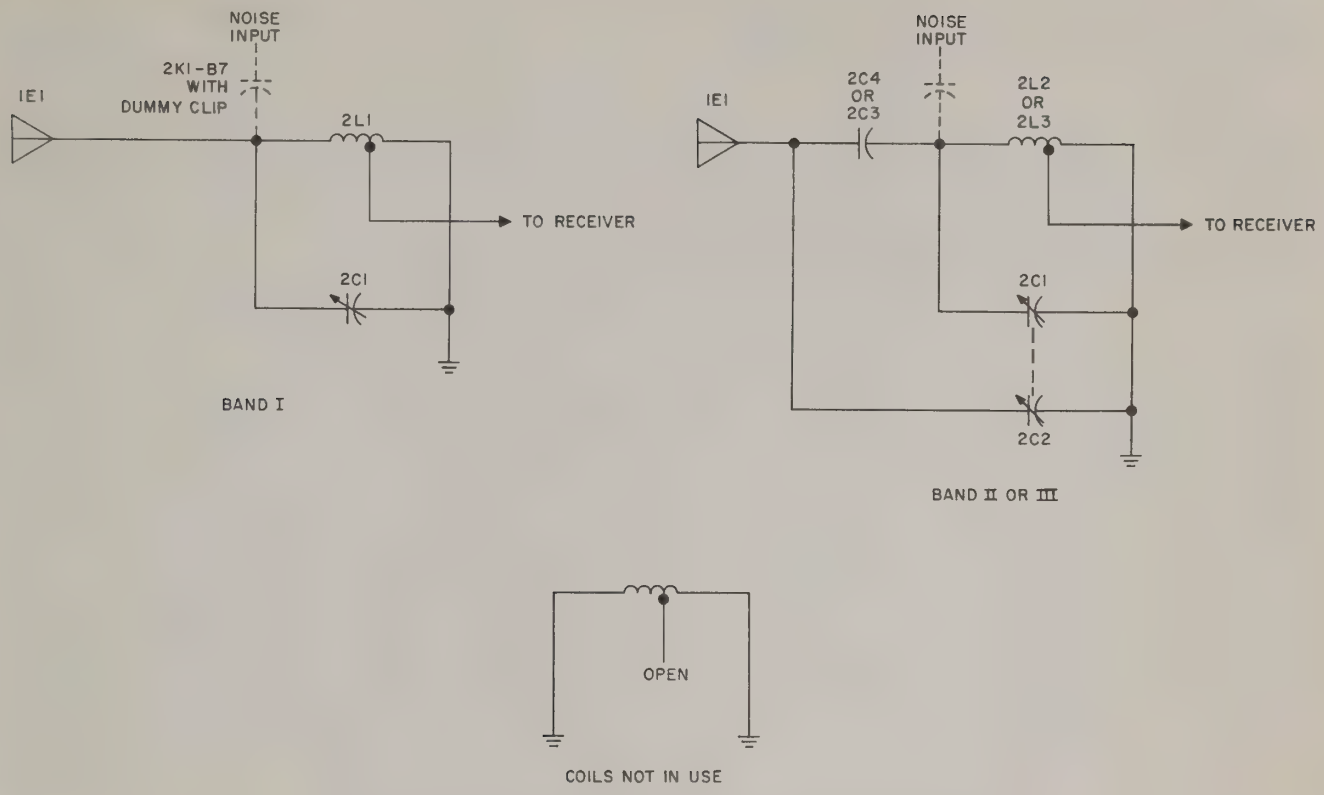


Figure 4-2. R. F. System, Simplified Schematic Diagram

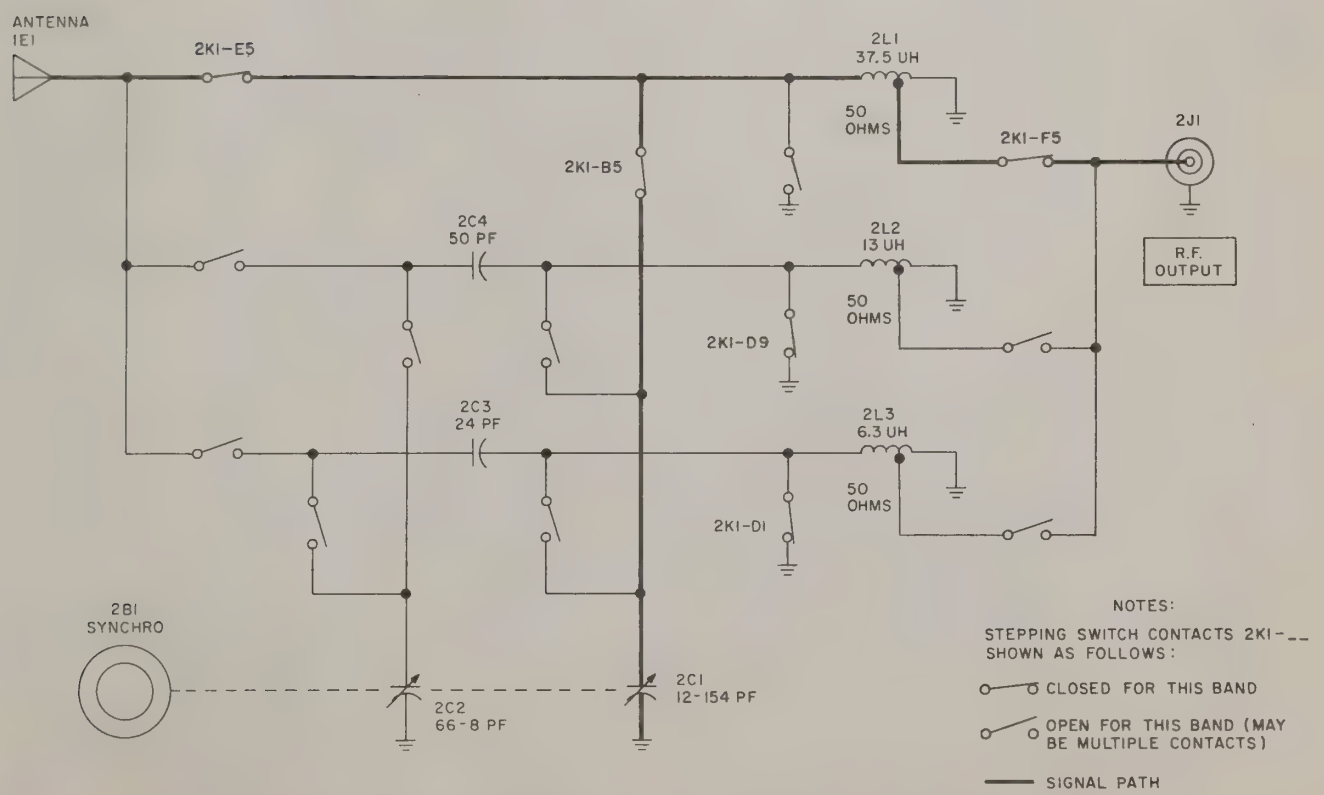


Figure 4-3. R. F. Circuitry for Band I, Schematic Diagram

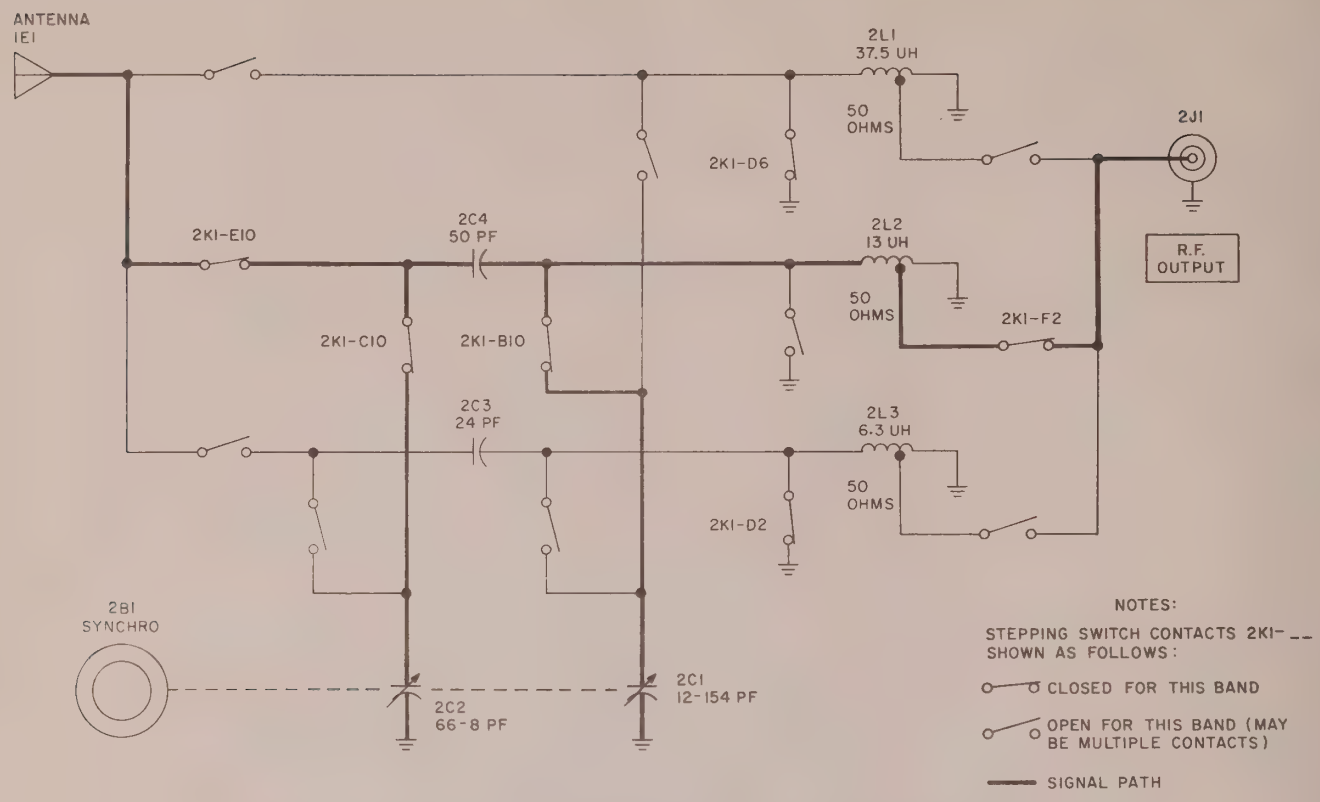


Figure 4-4. R. F. Circuitry for Band II, Schematic Diagram

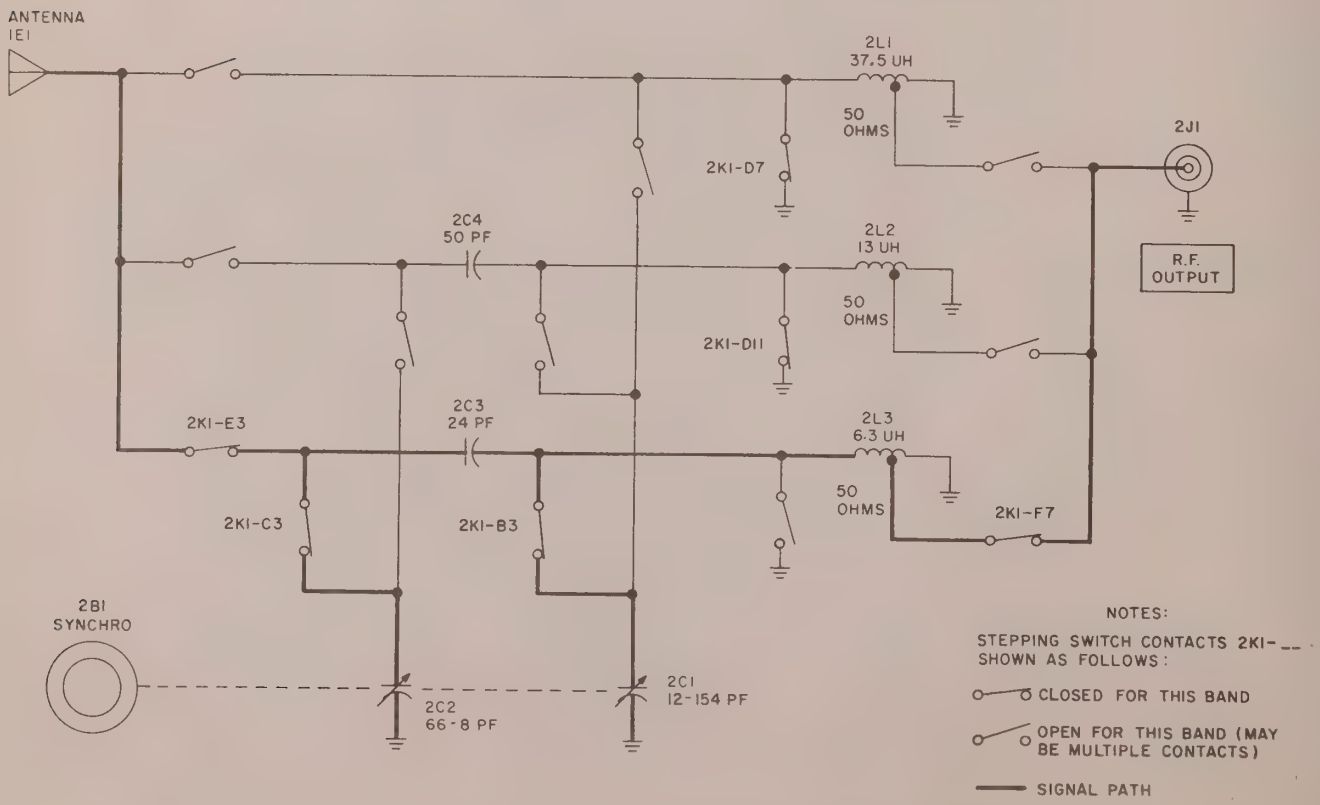


Figure 4-5. R. F. Circuitry for Band III, Schematic Diagram

switching diagrams for all three bands are given in figures 4-3, 4-4, and 4-5.

One coil is utilized for each band, and the Antenna sides of the other two coils not in use are shorted to ground, as shown in figures 4-2 through 4-5. The opposite ends of all the coils are permanently connected to ground. Each coil is tapped at a point which is nominally 50 ohms at the geometric mean frequency in each band; that is, the voltage standing wave ratio (VSWR) is 1.17 or less referred to 50 ohms. For each band, the impedance of the R. F. output to the receiver is actually achieved by utilizing a coil which has a fixed tap in a predetermined location and also one movable loop. The loop is formed in approximately the correct position, but if necessary it can be adjusted after installation in the R. F. Tuner to provide the lowest possible VSWR.

b. STEPPING SWITCH. (See figure 4-6.) Solenoid-operated rotary stepping switch 2K1 has five ceramic R. F. decks, one phenolic control deck with notch-homing, an interrupter switch, and a solenoid. The connections to each R. F. deck are shown in figure 4-1, and all the R. F. switch contacts that are closed in each frequency band are shown in figures 4-3, 4-4, and 4-5. The control deck is designated A, and its contacts are designated 2K1-A1, 2K1-A2, 2K1-A3, etc. The R. F. decks are designated B, C, D, E, and F, and their contacts are designated in the same sequence.

Each deck has 12 positions, with the unused contacts removed. However, the switch is connected to operate as a multi-pole, three-throw switch. It is controlled by single-pole, triple-throw BANDSWITCH rotary switch 3S3 on the Antenna Control unit front panel. The switch positions are marked with the frequency range of each band.

The stepping switch control scheme requires that the switch find the one control wire which has power applied to it. Therefore, a notch-homing control deck is used. When power is applied to any clip touching the rotor, it is conducted through the common clip (2K1-A4) and the interrupter switch to the solenoid coil (2K1). The switch then advances automatically until the notch reaches the selected clip. The interrupter is mechanically synchronized to the solenoid action by a cam. Normally closed, the interrupter is opened by the cam just before the solenoid reaches the last few degrees of its forward stroke, thus cutting the power. A scroll spring returns the solenoid to its starting position. During the last few degrees of the return stroke, the inter-

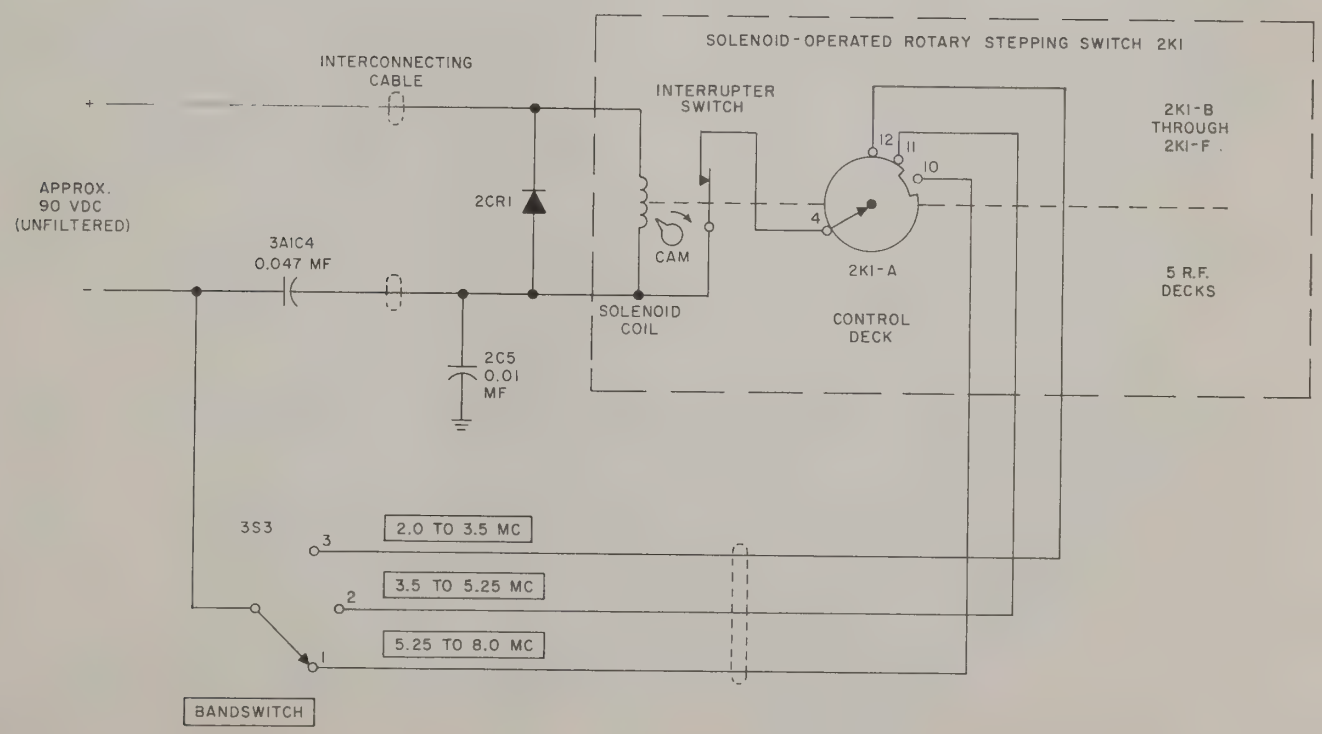


Figure 4-6. Stepping Switch Solenoid Circuit, Schematic Diagram

rupter closes again, and the stepping cycle repeats, provided that the notch has not reached the selected position.

When switch 3S3 applies dc power through the control deck to the solenoid, the solenoid rotates the switch rotor through a floating ratchet mechanism. When the selected position is reached, the notch on the control deck cuts off the dc power to the solenoid coil. It remains de-energized until a new position is selected by switch 3S3.

The solenoid is supplied with approximately 90 volts dc power, which is rectified but not filtered nominal 115 volt ac primary power, as discussed in paragraph 4-1e below. The power is supplied directly from bridge 3A1CR1-CR2-CR3-CR4. Capacitor 3A1C4 and diode 2CR1 provide arc suppression when the solenoid coil circuit is broken, and capacitor 2C5 is a high-frequency noise filter to reduce R. F. noise pickup.

c. SYNCHRO SYSTEM. (See figure 4-7.) The synchro system, also called a selsyn system, consists of two torque synchros. The synchros make it possible to turn the variable capacitor continuously in either direction. A 15 to 1 speed reducer is employed to provide sufficient torque to drive the capacitor and also to give the operator "feel" when precisely tuning the R. F. system.

The synchros are types 31TR6b and 31TX6b, which are identical in operation and construction except for a damper built in the type 31TR6b. In this particular application, the type 31TR6b torque receiver is actually used as the torque transmitter. This is done because the damper helps prevent rotation of the synchro when the ac power is turned on and the two synchros are not in phase. In addition, the type 31TX6b torque transmitter is actually used as the torque receiver. Unintentional motion of this synchro is prevented by the locking action of the worm and wheel gears in the speed reducer.

Synchro 3A2B1 is turned by the operator, using TUNING CONTROL spinner knob 3MP2. Fifteen complete turns of the knob are required to rotate the variable capacitor through its full travel. Synchro 2B1 moving in coordination with synchro 3A2B1 turns capacitor 2C1-2C2 through the right-angle drive speed reducer. There is no mechanical stop.

The synchro in the R. F. Tuner is mounted on speed reducer subassembly 2A1, but is not considered to be part of that subassembly. The synchro in the Antenna Control unit is part of the synchro subassembly 3A2.

The rotors of the synchros are furnished with nominal 115 volt, single-phase, 60 cps power, which is supplied through the Antenna Control unit, and the stators are interconnected conventionally. Capacitors 3A1C1 and 3A1C2 provide high-frequency filtering for the 115 volt ac lines to the synchro in the R. F. Tuner.

d. NOISE GENERATION SYSTEM. (See figure 4-8.) The noise generation circuit in the Antenna Control unit creates low-level random noise to permit tuning the R. F. system in the absence of external signal. Noise is generated by a reversed-polarity diode, which is a zener type of semiconductor device operating in an unstable region above its reference voltage.

The generated noise is loosely coupled to the R. F. system. This connection is shown by dashed lines in figures 4-2 and 4-8. The noise level is adjustable.

The noise generation circuit is activated by single-pole, single-throw NOISE GENERATOR toggle-

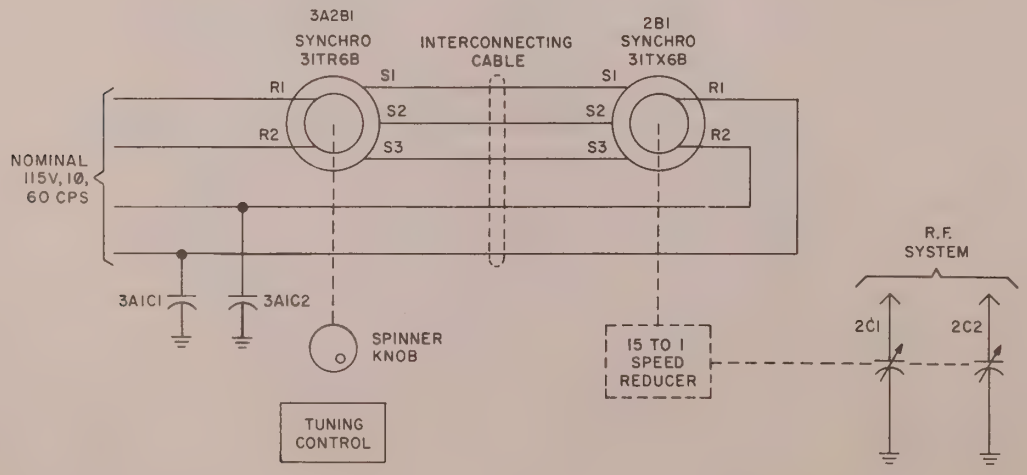


Figure 4-7. Synchro System, Schematic Diagram

switch 3S2 on the front panel. Neon glow ON lamp 3DS2 with a red lens lights when dc power is supplied to the circuit. The approximately 90 volt dc supply is filtered, but not regulated. It should be noted that this switch and light can also be used to check that dc power is available in the equipment.

Note

Do not leave the NOISE GENERATOR switch turned on any longer than absolutely necessary. The Antenna will transmit the random noise at low level, which might interfere with other receiving systems in the vicinity.

Dc voltage is applied to noise generating diode 3A1CR5 through current-limiting resistor 3A1R6. Resistor 3A1R7 provides a direct current return path. Capacitor 3A1C6 couples the ac (noise) to potentiometer 3A1R8, and capacitor 3C9 couples the noise to the output from the Antenna Control unit. Capacitor 3A1C7 and resistor 3A1R8 form an equalizing network to reduce the very high-frequency noise. Capacitor 3A1C8 is an R. F. bypass to ground. Potentiometer 3A1R8, which has a locked screwdriver adjustment, controls the noise output level. The level is set during final tests but may be adjusted if desirable to provide a more suitable signal at the receiver connected to the system.

In the R. F. Tuner, the noise is coupled to the R. F. system through stepping switch contact 2K1-B7, which has a dummy clip. This contact acts like a low-value capacitor with air and ceramic dielectric. Resistor 2R1 provides an input impedance of nominally 50 ohms to ground, thus terminating the noise input cable.

The noise generating diode and all resistors and capacitors (except 3C9) in the Antenna Control unit are mounted on terminal board 3A1TB1 and are part of power supply and noise generator subassembly 3A1.

e. POWER SYSTEM. (See figure 4-9.) Primary power of 115 ±12 volts, single phase, 60 ±3 cps, 100 volt-amperes or 15 watts maximum, is supplied to the Antenna Control unit. Fuses 3F1 and 3F2 of 1.5 amperes protect the equipment, and spare fuse 3F3 is also provided on the front panel. All fuses are in indicating fuseholders; the spare fuseholder is not connected.

Double-pole, single-throw POWER toggleswitch 3S1 on the front panel connects the 115 volt ac power to the synchro rotors (refer to paragraph 4-1c above) and to the rectifier bridge. As mentioned above, capacitors 3A1C1 and 3A1C2 provide high-frequency filtering for the ac lines to the rotor of synchro 2B1 in the R. F. Tuner. Neon glow ON lamp 3DS1 with a white lens lights when ac power is available in the equipment.

The full-wave bridge consisting of diodes 3A1CR1, 3A1CR2, 3A1CR3, and 3A1CR4 rectifies the input ac power. Resistors 3A1R1 and 3A1R2 limit the current which can be applied to the diodes, thus protecting them from high surges caused by shorting or grounding the dc lines. Both sides of the dc circuit are off ground in this system. The case of large capacitor 3A1C3A - C3B - C3C is connected to the negative side (B-) of the power supply.

Resistor 3A1R3 is a bleeder resistor for the power supply. Triple-element capacitor 3A1C3A - C3B - C3C and resistors 3A1R4 and 3A1R5 provide filtering for the approximately 90 volts dc to the noise generation circuit (refer to paragraph 4-1d). Unfiltered dc power is supplied to the stepping switch solenoid (refer to paragraph 4-1b). Voltage regulation is not needed in this equipment.

The rectifiers, resistors, and filter capacitor are mounted on terminal board 3A1TB1 and are part of power supply and noise generator subassembly 3A1.

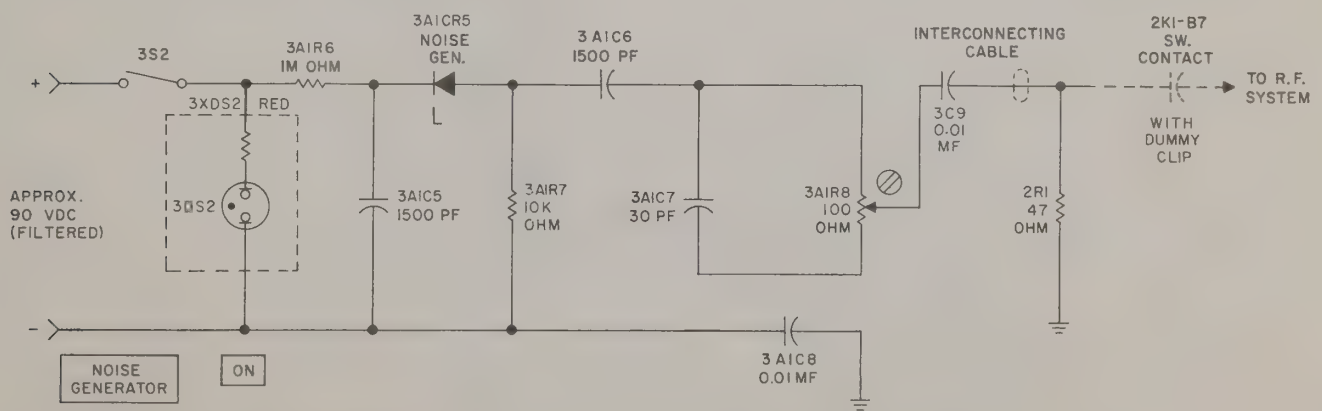


Figure 4-8. Noise Generation System, Schematic Diagram

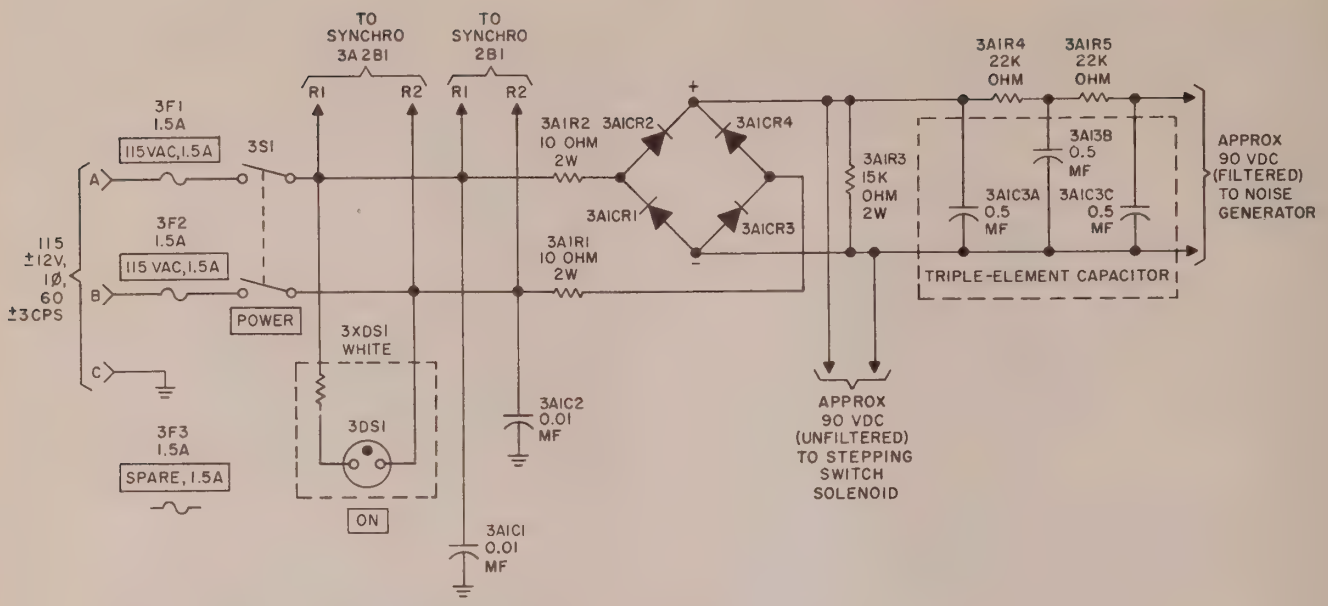


Figure 4-9. Power System, Schematic Diagram

4-2. TROUBLE LOCATION.

Trouble-shooting guides, including possible symptoms of trouble, various possible causes, and possible solutions are given in table 4-1 to aid in localizing faults. However, it is recommended that logical trouble-shooting procedures be utilized, based on an understanding of the functions and the principles of operation of the equipment, as given in paragraph 4-1 above.

In the event of a failure or a suspected failure, all possible sources of trouble should be investigated before demounting the R. F. Tuner and opening the housing (cover). If the fault cannot be definitely localized in the Antenna Control unit or in the R. F. Tuner, the following possible causes should be checked:

a. Continuity of all applicable conductors in electrical cables.

b. Making of all applicable contacts in connectors.

4-3. TEST DATA.

Typical voltage and resistance measurements for critical points in the equipment are given in tables 4-2 through 4-5.

TABLE 4-1. TROUBLE SHOOTING CHART

TROUBLE	POSSIBLE CAUSE	POSSIBLE SOLUTION
Fuse blown	Power lead shorted or grounded	Repair
	Connector 3J2 or 2J3 terminals shorted or grounded	Repair or replace
	Diodes 3A1CR1, 3A1CR2, 3A1CR3, and/or 3A1CR4 shorted	Repair
	Synchro 3A2B1 shorted	Replace
	Synchro 2B1 shorted	Replace
	Speed reducer or variable capacitor 2C1-2C2 will not rotate (frozen)	Replace
	Switch solenoid 2K1 shorted	Repair or replace stepping switch

TABLE 4-1. TROUBLE SHOOTING CHART (Cont)

TROUBLE	POSSIBLE CAUSE	POSSIBLE SOLUTION
White power ON lamp does not light	No nominal 115 vac input	Restore power
	Lamp burned out	Replace
	Switch 3S1 open	Replace
Red noise generator ON lamp does not light	Lamp burned out	Replace
(NOTE: This also indicates that no dc power is available.)	Diodes 3A1CR1, 3A1CR2, 3A1CR3, and/or 3A1CR4 open	Determine cause and replace
	Switch 3S2 open	Replace
	Resistor 3A1R4 or 3A1R5 open	Replace
No noise generator output at receiver	Antenna and R. F. Tuner not tuned	Tune properly (refer to Section 3)
	No noise generator output from Antenna Control unit	Determine cause and repair
	Noise cable and/or connector(s) open	Repair or replace
	Receiver cable and/or connector(s) open	Repair or replace
	R. F. circuit in R. F. Tuner open	Repair
	Stepping switch R. F. contact(s) open	Replace stepping switch
No noise generator output from Antenna Control unit	Diode 3A1CR5 open or shorted	Replace
	Other noise generator circuit components open or shorted	Replace
No R. F. output in one band	Stepping switch not turned to proper position	Check stepping switch operation and replace if necessary
	Coil open or shorted	Repair or replace
	Variable capacitor open	Replace
	Fixed capacitor 2C4 or 2C3 open (Band II or III only)	Replace
	Stepping switch contact(s) open or shorted to ground	Repair or replace stepping switch
	R. F. circuit open	Repair

TABLE 4-1. TROUBLE SHOOTING CHART (Cont)

TROUBLE	POSSIBLE CAUSE	POSSIBLE SOLUTION
No R. F. output at any frequency (NOTE: This assumes that noise generator output is present at receiver.)	Antenna lead disconnected	Repair
	Antenna open internally	Replace
	Stepping switch contact(s) open or shorted to ground	Repair or replace stepping switch
BANDSWITCH does not cause change of bands	No dc power	Determine cause and repair
	Switch 3S3 open	Replace
	Switch solenoid 2K1 open	Repair or replace stepping switch
	Stepping switch does not change position	Replace stepping switch
	Lack of continuity of interconnection	Repair or replace
TUNING CONTROL not functioning	Synchro 3A2B1 or 2B1 open	Replace
	Spinner knob 3MP2 slipping on shaft	Tighten set screws or replace knob
	Lack of continuity of interconnection	Repair or replace
	Shaft coupling 2A1MP5 between synchro 2B1 and speed reducer slipping or broken	Repair or replace coupling
	Shaft coupling 2MP4 between speed reducer and variable capacitor 2C1-2C2 slipping or broken	Tighten set screws or replace coupling

TABLE 4-2. R. F. TUNER UNIT DC RESISTANCE TEST DATA
(Unit No. 2)

CIRCUIT SECTION		NORMAL VALUE ±20% OHMS	REMARKS
BETWEEN POINT	AND POINT		
2J1	Ground	0	
2J2	Ground	47	
2J3	Ground	Inf	All pins except D and M
		0	Pins D and M
DC Control Circuit (All Points)	Ground (Chassis)	Inf	Both sides of DC power and control circuits are off ground
Across 2K1 Solenoid Coil		180	
R1 of 2B1	R2 of 2B1	25	With cable disconnected from J3
Any R of 2B1	Any S of 2B1	Inf	

TABLE 4-2. R. F. TUNER UNIT DC RESISTANCE TEST DATA (Cont)
(Unit No. 2)

CIRCUIT SECTION		NORMAL VALUE ±20% OHMS	REMARKS
BETWEEN POINT	AND POINT		
S1 of 2B1	S2 of 2B1	25	With cable disconnected from 2J3
S2 of 2B1	S3 of 2B1	25	
S3 of 2B1	S1 of 2B1	25	
Antenna Terminal	Ground	0	2K1 in Band I position
		Inf	2K1 in Band II or III position
2C1	Ground	0	
2C2	Ground	Inf	

TABLE 4-3. R. F. TUNER UNIT VOLTAGE TEST DATA
(Unit No. 2)

CIRCUIT SECTION		NORMAL VALUE ±20% VOLTS	REMARKS
BETWEEN POINT	AND POINT		
R1 of 2B1	R2 of 2B1	115 VAC	
Any S of 2B1	Any S of 2B1	0 to 90 VAC	

TABLE 4-4. ANTENNA CONTROL UNIT DC RESISTANCE TEST DATA
(Unit No. 3)

CIRCUIT SECTION		NORMAL VALUE ±20% OHMS	REMARKS
BETWEEN POINT	AND POINT		
Control Circuit (All Points)	Ground (Housing)	Inf	With connector P1 disconnected from connector 2J1 (nominal 115 vac input)
Across 3A1R3			
+	-	15K	
-	+	2K ±50%	
Across 3A1CR1			
+	-	20K ±50%	
-	+	600 ±50%	

TABLE 4-4. ANTENNA CONTROL UNIT DC RESISTANCE TEST DATA (Cont)
(Unit No. 3)

CIRCUIT SECTION		NORMAL VALUE ±20% OHMS	REMARKS
BETWEEN POINT	AND POINT		
Across 3A1CR2			
+	-	20K ±50%	
-	+	600 ±50%	
Across 3A1CR3			
+	-	20K ±50%	
-	+	600 ±50%	
Across 3A1CR4			
+	-	20K ±50%	
-	+	600 ±50%	
3J3	Ground	Inf 47	R. F. cable disconnected from 3J3 R. F. cable connected to 3J3
R1 of 3A2B1	R2 of 3A2B1	25	With cables disconnected from 3J2 and 3J1
Any R of 3A2B1	Any S of 3A2B1	Inf	
S1 of 3A2B1	S2 of 3A2B1	25	
S2 of 3A2B1	S3 of 3A2B1	25	
S3 of 3A2B1	S1 of 3A2B1	25	
R1 of 3A2B1	R2 of 3A2B1	12	With cable connected from 3J2 to 2J3, interconnecting the synchros, and with power cable disconnected from 3J1
Any R of 3A2B1	Any S of 3A2B1	Inf	
S1 of 3A2B1	S2 of 3A2B1	12	
S2 of 3A2B1	S3 of 3A2B1	12	
S3 of 3A2B1	S2 of 3A2B1	12	
3J2	Ground	Inf	All pins except D and M
		0	Pins D and M

TABLE 4-5. ANTENNA CONTROL UNIT VOLTAGE TEST DATA
(Unit No. 3)

CIRCUIT SECTION		NORMAL VALUE ±20% OHMS	REMARKS
BETWEEN POINT	AND POINT		
R1 of 3A2B1	R2 of 3A2B1	115 VAC	
Any S of 3A2B1	Any S of 3A2B1	0 to 90 VAC	

TABLE 4-5. ANTENNA CONTROL UNIT VOLTAGE TEST DATA (Cont)
(Unit No. 3)

CIRCUIT SECTION		NORMAL VALUE ±20% VOLTS	REMARKS
BETWEEN POINT	AND POINT		
Across 3A1R3		130 VDC	NOISE GENERATOR switch 3S2 ON or OFF
Across 3XDS2		100 VDC	NOISE GENERATOR switch 3S2 ON
		0 VDC	NOISE GENERATOR switch 3S2 OFF
Across 3A1CR5		44 VDC	NOISE GENERATOR switch 3S2 ON
NOTE: Case of 3A1C3A - C3B - C3C is negative of power supply (B-).			

SECTION 5

MAINTENANCE

5-1. FAILURE, AND PERFORMANCE AND OPERATION REPORTS.

The Naval Ship Systems Command no longer requires the submission of failure reports for all equipments. Failure reports and performance and operational reports are to be accomplished for designated equipments only to the extent required by existing directives. (Refer to Electronics Installation and Maintenance Book, NAVSHIPS 0967-000-0000.) All failures shall be reported for those equipments requiring use of failure reports.

5-2. PREVENTIVE MAINTENANCE.

a. NO PROCEDURES OR LUBRICATION. No regular preventive maintenance procedures are required or recommended for Antenna Group AN/SRA-43. No lubrication should be performed.

b. DESICCANT INDICATION AND REPLACEMENT. Approximately 1 ounce of an indicating desiccant is placed in a container which is visible through a plexiglass window in the front cover plate of the R. F. Tuner. See figure 5-1. The silica gel desiccant not only indicates the relative humidity but also absorbs small amounts of moisture which may condense inside the watertight enclosure.

Silica gel gradually changes color from deep blue in the activated condition to pale pink or orange in the saturated condition. The desiccant color indicates the following relative humidity:

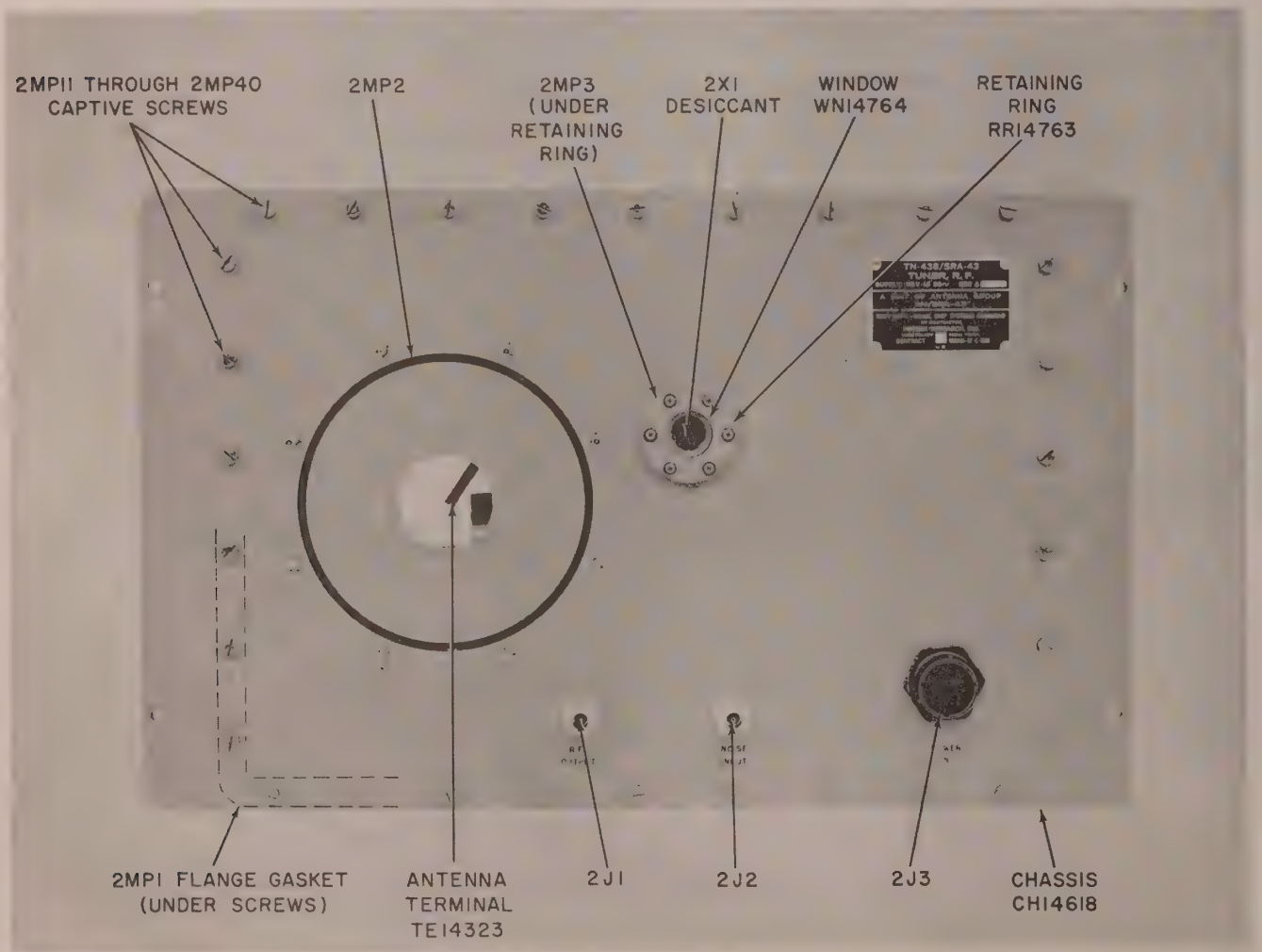


Figure 5-1. R. F. Tuner Parts Location on Exterior of Chassis (Front Cover)

(1) Blue	Activated
(2) Violet	20% Relative Humidity
(3) Pink (Brown-Orange)	40% Relative Humidity
(4) Pale Pink (Orange)	60% Relative Humidity

The silica gel should be replaced or reactivated whenever a pink, brown, or orange color is apparent. If convenient, it may also be replaced or reactivated when it becomes any color other than deep blue. The silica gel can be reactivated by heating at 350° F (177° C) in a clean atmosphere until it becomes blue again.

The desiccant can be removed from desiccant container CN14762 by removing the six screws in retaining ring RR14763 and lifting the retaining ring and plexiglass window WN14764 from the front of the R. F. Tuner. In replacing the window and the retaining ring, care must be taken to tighten the screws securely so that the window compresses O-ring 2MP3, thus maintaining the watertight integrity of the enclosure. Before the window is replaced, the O-ring should be coated lightly with electrical sealing and insulating compound, Dow Corning 4 Compound or equivalent per MIL-S-8660B.

5-3. REMOVAL, REPAIR, AND REPLACEMENT OF PARTS.

This equipment is designed for optimum maintainability. In all cases, replacement procedures are opposite to the following removal procedures:

a. ANTENNA.

(1) Loosen and disengage the 30 captive screws 2MP11 through 2MP40 securing the R. F. Tuner unit housing (cover) HS14335, and remove this cover. For cover replacement instructions, refer to paragraph 5-3b.

(2) Remove the nut from antenna terminal TE14323 to disconnect the Antenna lead wire lug.

(3) Loosen and remove the eight nuts and washers securing antenna retaining ring RR14738, and remove the retaining ring by passing it over the full length of the Antenna. Support the Antenna during this operation.

(4) Remove and replace the Antenna. No repair is possible ordinarily.

(5) Before replacing the antenna, O-ring 2MP2 should be coated lightly with electrical sealing and insulating compound, Dow Corning 4 Compound or equivalent per MIL-S-8660B.

b. RADIO FREQUENCY TUNER. (See figures 5-1, 5-2, and 5-3.)

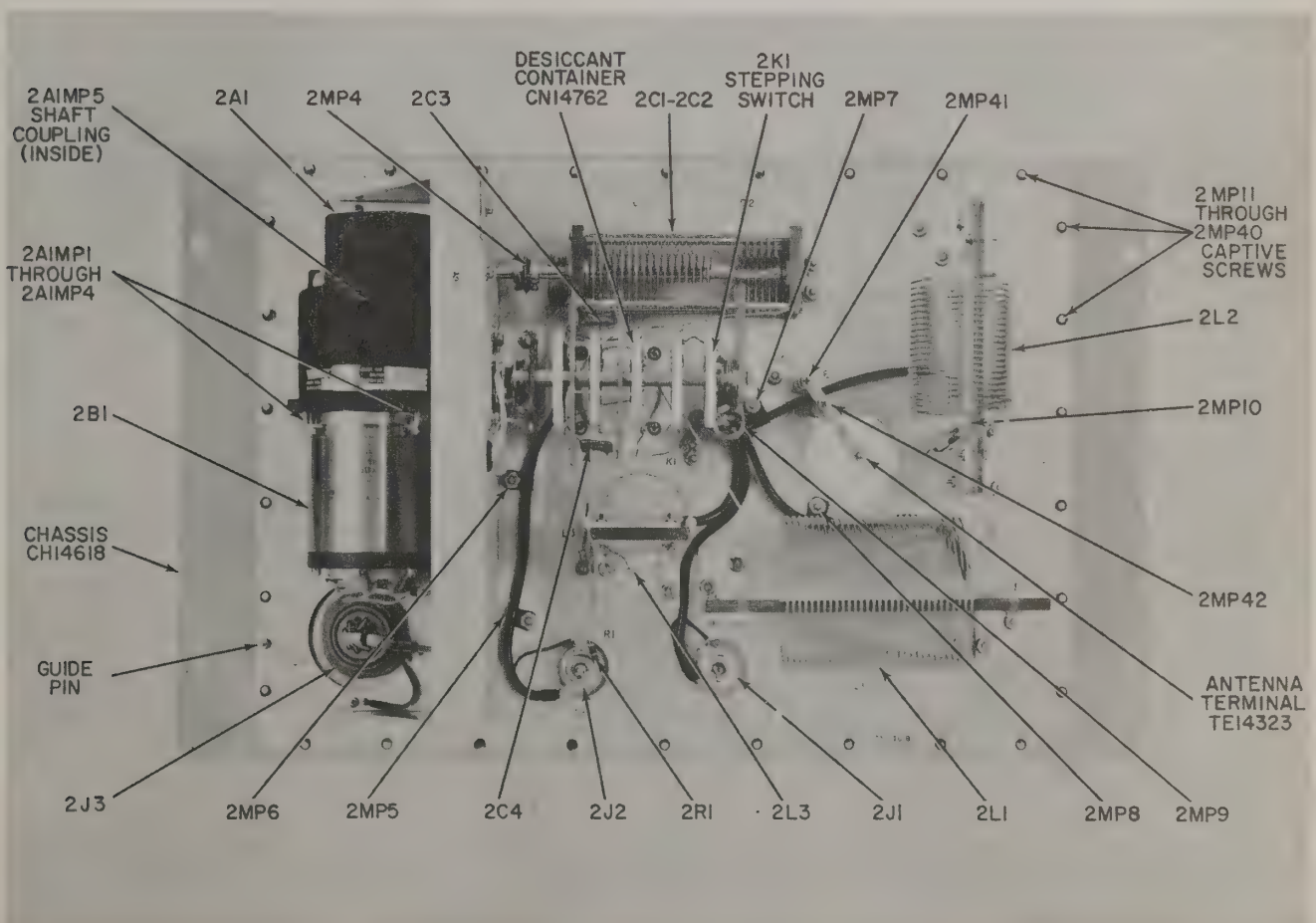


Figure 5-2. R. F. Tuner Parts Location on Interior of Chassis (Base Plate), with Housing (Cover) Removed

(1) Housing (Cover) Removal and Replacement.

(a) Loosen and disengage the 30 captive screws 2MP11 through 2MP40 securing the R. F. Tuner unit housing (cover) HS14335, and remove this cover. This operation exposes all parts and makes apparent the removal and replacement procedures required for all parts except those covered in the following paragraphs.

(b) Before replacement of the cover, lightly coat the rubber portion of flange gasket 2MP1 with electrical sealing and insulating compound, Dow Corning 4 Compound or equivalent per MIL-S-8660B. Do not coat the braided-wire mesh, which provides ground connection for the cover.

(c) To replace the cover, carefully place it on the R. F. Tuner chassis CH14618 until it seats with the guide pin inserted in its hole. Engage the captive screws and tighten them first by hand and then with a screwdriver. It is good practice to tighten the screws in sequence around the cover and in two or three stages, applying approximately the same torque to all screws.

(2) Synchro 2B1.

(a) Remove the five screws from the terminal board at the back of the synchro, and disconnect the lead wire lugs.

(b) Loosen the four no. 8 screws and rotate the four synchro clamps 2A1MP1 through 2A1MP4 to free the synchro. Slide out the synchro, with the male coupling disc and hub mounted on the shaft.

(c) Loosen the two set screws to dismount the male end of shaft coupling 2A1MP5. For re-installation, make sure that the hub is toward synchro and disc is flush with end of the shaft.

(d) To re-install the synchro, slide it into the speed reducer assembly housing, making sure that the pin on the male coupling disc slides into the groove in the female coupling disc on the speed reducer shaft. This can be observed through the access holes in the speed reducer assembly housing.

(3) Speed Reducer Subassembly 2A1.

(a) Remove the synchro as described above.

Note

The synchro and the speed reducer subassembly may be removed and replaced as a combined assembly.

(b) Loosen the four set screws in shaft coupling 2MP4 connected to the variable capacitor, 2C1-2C2, and slide out of the way.

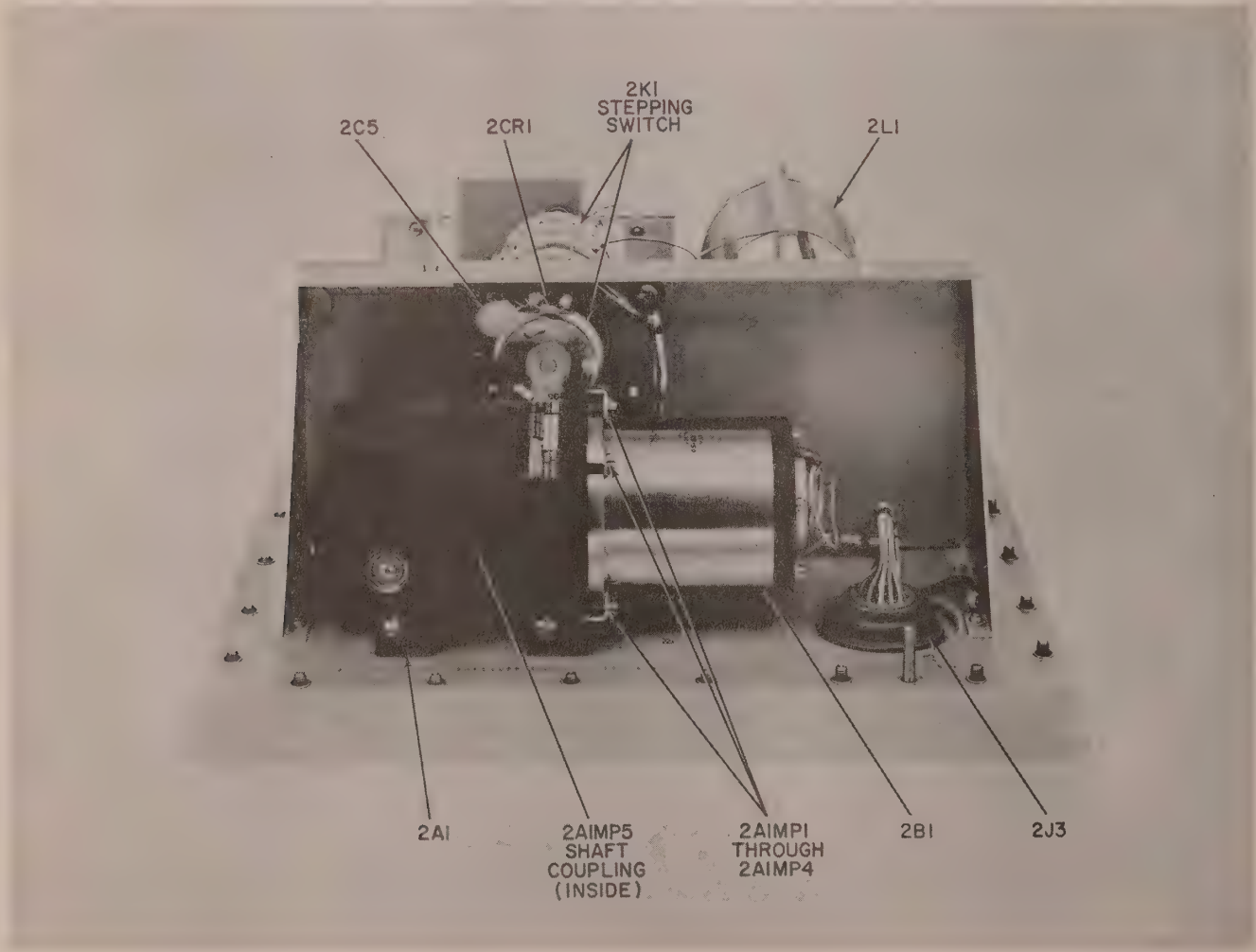


Figure 5-3. R. F. Tuner Parts Location on Interior of Chassis and on Stepping Switch Shield and Support, with Housing (Cover) Removed

(c) Remove the three nuts from the mounting studs in chassis CH14618.

(4) Capacitor 2C1 - 2C2.

(a) Desolder the leads.

(b) Loosen the four set screws in shaft coupling 2MP4 and slide out of the way.

(c) Remove the four nuts from the mounting studs in chassis CH14618.

(5) Coils 2L1, 2L2, and 2L3.

(a) Desolder the leads.

(b) Remove the screws from the captive nuts in the coil brackets.

c. ANTENNA CONTROL. (See figures 5-4, 5-5, and 5-6.)

(1) Synchro 3A2B1.

(a) Remove TUNING CONTROL knob 3MP2.

(b) Remove the four no. 10 screws and washers from the top of Antenna Control unit housing HS14859, and lift out the synchro subassembly.

(c) Remove the five screws from the terminal board at the back of the synchro and disconnect the lead wire lugs.

(d) Loosen four no. 10 screws and rotate the four synchro clamps 3A2MP1 through 3A2MP4 to free the synchro.

(2) Terminal Board 3A1TB1.

Note

All electronic components and interconnecting leads can be removed from the terminal board without removing it from the Antenna Control unit. However, it may be necessary to remove the terminal board to check or replace a jumper wire or terminal.

(a) Remove four no. 6 screws and washers from the top of the housing.

(b) Lift and tilt out the terminal board.

Note

Enough cable loop is provided to enable tilting out the terminal board for general repair work without disconnecting the cable harness or dismounting the connectors.

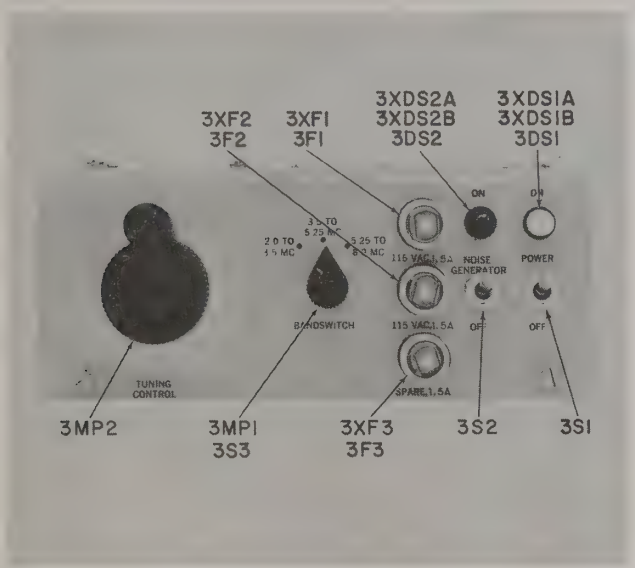


Figure 5-4. Antenna Control Unit Parts Location on Front Panel

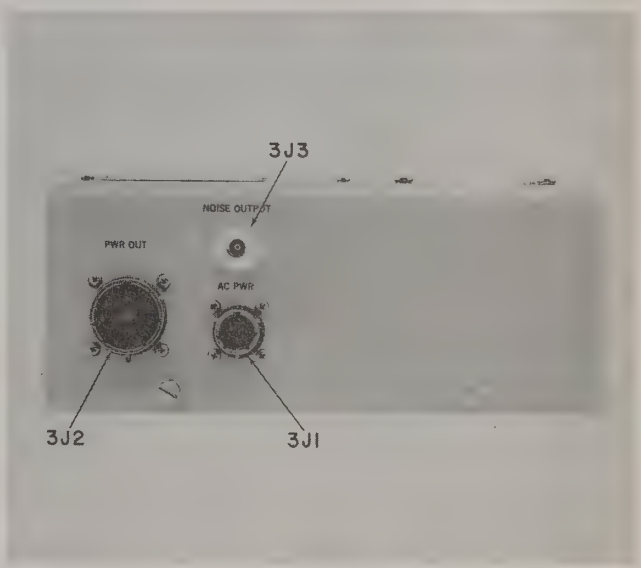


Figure 5-5. Antenna Control Unit Parts Location on Rear Panel

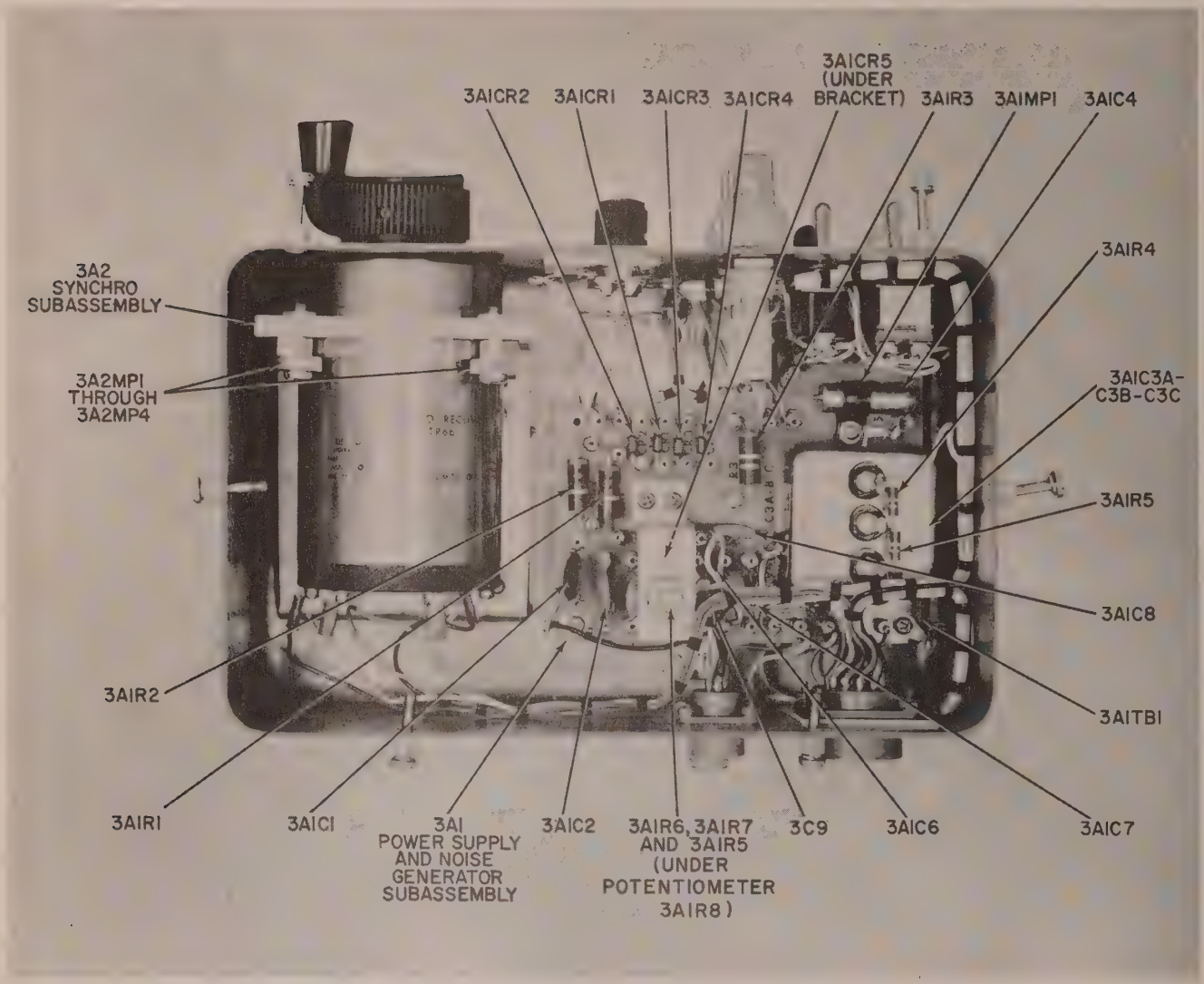


Figure 5-6. Antenna Control Unit Parts Location in Interior, with Base Removed

SECTION 6

PARTS LIST

6-1. REFERENCE DESIGNATIONS.

Reference designations have been assigned to identify all maintenance parts of Antenna Group AN/SRA-43. They are stenciled on the equipment adjacent to the part they identify and are also used on the assembly drawings, schematics, and interconnecting diagrams as well as in the parts list.

The unit numbering method of reference designations and generic group designations is employed. When the complete reference designation of a part is known, this designation also identifies the unit in which the part is located and the subassembly (if any) of which it is a part. The first number of a complete reference designation is the unit number, and the next letter and number (A1 or A2) is the subassembly designation.

6-2. LIST OF UNITS.

Table 6-1 lists the three units of Antenna Group AN/SRA-43. Table 6-1 also provides the number of the first page of the parts listing in table 6-3. Mating connectors and adapters supplied with the equipment are listed in table 6-2.

6-3. MAINTENANCE PARTS LIST.

Table 6-3 lists the units, their major subassemblies, and their maintenance parts. The parts of each unit and subassembly are grouped together.

Column 1 lists the reference designation of the unit, subassembly designation where applicable, generic symbol indicating the type of part, and numerical designation differentiating between parts of the same generic group.

Column 2 is available for explanatory notes which may be required in later revisions of this technical manual.

Column 3 provides the approved nomenclature in accordance with the Federal Item Identification Guide H6-1 and descriptions as provided by Federal Standard Specification No. 5 and modified by NAVSHIPS 900, 181. Complete information is given for all key parts (parts differing from any part previously listed in this table), but the name and description are omitted for other parts. However, reference is made to the key part for the information.

Column 4 references the illustration establishing the physical location of each part.

6-4. MANUFACTURERS.

A list of the manufacturers of parts used in the equipment is not required, since their names are included in tables 6-2 and 6-3, except for Military standard parts.

TABLE 6-1. LIST OF UNITS, ANTENNA GROUP AN/SRA-43

UNIT NO.	QTY	NOTES	NAME OF UNIT	FIG. NO.	PARTS LIST STARTING PAGE
1	1		ANTENNA, AS-1857/SRA-43, Parzen Research AT14637	1-2	6-6
2	1		TUNER, R. F., TN-438/SRA-43, Parzen Research AS14846	1-3, 5-1, 5-2, and 5-3	6-6
3	1		CONTROL, ANTENNA, C-6828/SRA-43, Parzen Research AS14847	1-4, 5-4, 5-5, and 5-6	6-9

TABLE 6-2. LIST OF MATING CONNECTORS AND ADAPTERS

REF DESIG	USED WITH UNIT NO.	NOTES	NAME AND DESCRIPTION	FIG. NO.
P1	3		CONNECTOR, ELECTRICAL, Straight, MIL MS3116F-12-3S	2-8
P2	3		CONNECTOR, ELECTRICAL, Straight, Parzen Research CN14314	2-8
P3	2		CONNECTOR, ELECTRICAL, Right Angle, Parzen Research CN14315	2-8
P4	3		CONNECTOR, R. F. TYPE N, Straight, MIL UG-941B/U	2-8
P5	2		CONNECTOR, R. F., Right Angle, Parzen Research CN14316	2-8
P6	2		Same as P5	2-8
MP1	2		SLEEVE, MIL AN3420-20A (Use is optional)	2-8
MP2	3		SLEEVE, Parzen Research SL14399 (Use is optional)	2-8

TABLE 6-3. MAINTENANCE PARTS LIST, ANTENNA GROUP AN/SRA-43, Parzen Research AS14300

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
1E1		ANTENNA, AS-1857/SRA-43, Parzen Research AT14637	1-2
2		TUNER, R. F., TN-438/SRA-43, Parzen Research AS14846	1-3, 5-1, 5-2, and 5-3
2A1		SPEED REDUCER SUBASSEMBLY, Parzen Research SA14333	5-2 and 5-3
2A1MP1		CLAMP, SYNCHRO, Parzen Research CP14420	5-2 and 5-3
2A1MP2		Same as 2A1MP1	5-2 and 5-3
2A1MP3		Same as 2A1MP1	5-2 and 5-3
2A1MP4		Same as 2A1MP1	5-2 and 5-3
2A1MP5		COUPLING, SHAFT, Parzen Research CU14419	5-2
2B1		SYNCHRO, MIL 31TX6b	5-2 and 5-3
2C1-2C2		CAPACITOR, VARIABLE, DUAL SECTION, Parzen Research CV14850	5-2

TABLE 6-3. MAINTENANCE PARTS LIST, ANTENNA GROUP AN/SRA-43, Parzen Research AS14300 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2C3		CAPACITOR, FIXED, MICA, 24 pf, 2500 vdc, Parzen Research CF14311	5-2
2C4		CAPACITOR, FIXED, MICA, 50 pf, 2500 vdc, Parzen Research CF14310	5-2
2C5		CAPACITOR, FIXED, CERAMIC, MIL CK63AW103M	5-3
2CR1		DIODE, SILICON, MIL 1N4246	5-3
2J1		CONNECTOR, R. F., TYPE N, MIL UG-680A/U	5-1 and 5-2
2J2		Same as 2J1	5-1 and 5-2
2J3		CONNECTOR, ELECTRICAL, MIL MS3114E-20-16P	5-1, 5-2, and 5-3
2K1		SWITCH, STEPPING, ROTARY SOLENOID, Parzen Research SS14583	5-2 and 5-3
2L1		COIL, R. F., Parzen Research CL14852	5-2 and 5-1
2L2		COIL, R. F., Parzen Research CL14853	5-2
2L3		COIL, R. F., Parzen Research CL14854	5-2
2MP1		GASKET, FLANGE, Parzen Research GS14342 (Retained in housing HS14335 with adhesive)	5-1
2MP2		PACKING, PREFORMED (O-RING), MIL MS9021-257	5-1
2MP3		PACKING, PREFORMED (O-RING), MIL MS9021-022	5-1
2MP4		COUPLING, SHAFT, Parzen Research CU14343	5-2
2MP5		CLAMP, LOOP, MIL PP2, MS21919-3	5-2
2MP6		Same as 2MP5	5-2
2MP7		Same as 2MP5	5-2
2MP8		Same as 2MP5	5-2
2MP9		CLAMP, LOOP, MIL PP7, MS21919-8	5-2
2MP10		CLAMP, LOOP, Parzen Research CP14457	5-2
2MP11 through 2MP40		SCREW, REL BODY, Deutsch Fastener DPR79005	5-1 and 5-2
2MP41		TERMINAL INSULATOR, MIL NL633W01-008	5-2
2MP42		Same as 2MP41	5-2
2R1		RESISTOR, FIXED, COMPOSITION, MIL RC20GF470K	5-2
2X1		DESICCANT, MIL-D-3716, GRADE H, TYPE IV	5-1

TABLE 6-3. MAINTENANCE PARTS LIST, ANTENNA GROUP AN/SRA-43, Parzen Research AS14300 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3		ANTENNA, CONTROL, C-6828/SRA-43, Parzen Research AS14847	1-4, 5-4, 5-5, and 5-6
3A1		POWER SUPPLY AND NOISE GENERATOR SUB-ASSEMBLY, Parzen Research SA14857	5-6
3A1C1		Same as 2C5	5-6
3A1C2		Same as 2C5	5-6
3A1C3-C3B-C3C		CAPACITOR, FIXED, PAPER, TRIPLE SECTION. MIL CP54B5EF504V1	5-6
3A1C4		CAPACITOR, FIXED, PAPER, MIL CP05A1KF473K3	5-6
3A1C5		CAPACITOR, FIXED,MICA, MIL CM06D152JN3	5-6
3A1C6		Same as 3A1C5	5-6
3A1C7		CAPACITOR, FIXED, MICA, MIL CM05C330JN3	5-6
3A1C8		Same as 2C5	5-6
3A1CR1		Same as 2CR1	5-6
3A1CR2		Same as 2CR1	5-6
3A1CR3		Same as 2CR1	5-6
3A1CR4		Same as 2CR1	5-6
3A1CR5		DIODE, SILICON, NOISE GENERATION, Parzen Research DD14336	5-6
3A1MP1		CLAMP, LOOP, MIL PP5, MS21919-6	5-6
3A1R1		RESISTOR, FIXED, COMPOSITION, MIL RC42GF100J	5-6
3A1R2		Same as 3A1R1	5-6
3A1R3		RESISTOR, FIXED, COMPOSITION, MIL RC42GF153J	5-6
3A1R4		RESISTOR, FIXED, COMPOSITION, MIL RC20GF223J	5-6
3A1R5		Same as 3A1R4	5-6
3A1R6		RESISTOR, FIXED, COMPOSITION, MIL RC20GF105J	5-6
3A1R7		RESISTOR, FIXED, COMPOSITION, MIL RC20GF103J	5-6
3A1R8		RESISTOR, VARIABLE, COMPOSITION, MIL RV4LAYSA101A	5-6
3A1TB1		TERMINAL BOARD, Parzen Research TB14940	5-6
3A2		SYNCHRO SUBASSEMBLY, Parzen Research SA14344	5-6
3A2B1		SYNCHRO, MIL 31TR6b	5-6
3A2MP1		CLAMP, SYNCHRO, Parzen Research CP14338	5-6

TABLE 6-3. MAINTENANCE PARTS LIST, ANTENNA GROUP AN/SRA-43, Parzen Research AS14300 (Cont)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
3A2MP2		Same as 3A2MP1	5-6
3A2MP3		Same as 3A2MP1	5-6
3A2MP4		Same as 3A2MP1	5-6
3C9		Same as 2C5	5-6
3DS1		LAMP, GLOW, INCANDESCENT, MIL MS25252-NE2D	5-4 and 5-6
3DS2		Same as 3DS1	5-4 and 5-6
3F1		FUSE, CARTRIDGE, MIL F02A250V1.5A	5-4 and 5-6
3F2		Same as 3F1	5-4 and 5-6
3F3		Same as 3F1	5-4 and 5-6
3J1		CONNECTOR, ELECTRICAL, MIL MS3112E-12-3P	5-5 and 5-6
3J2		CONNECTOR, ELECTRICAL, MIL MS3112E-20-16S	5-5 and 5-6
3J3		Same as 2J1	5-5 and 5-6
3MP1		KNOB, MIL MS91528-1P2B	5-4 and 5-6
3MP2		KNOB, SPINNER, MIL MS91528-4S2B	5-4 and 5-6
3S1		SWITCH, TOGGLE, DPST, MIL MS35059-22	5-4 and 5-6
3S2		SWITCH, TOGGLE, SPST, MIL MS35058-22	5-4 and 5-6
3S3		SWITCH, ROTARY, Parzen Research SW14339	5-4 and 5-6
3XDS1A		LAMPHOLDER, MIL LH74	5-4 and 5-6
3XDS1B		LENS, MIL LC13WT	5-4 and 5-6
3XDS2A		Same as 3XDS1A	5-4 and 5-6
3XDS2B		LENS, MIL LC13RN	5-4 and 5-6
3XF1		FUSEHOLDER, MIL FHL17G	5-4 and 5-6
3XF2		Same as 3XF1	5-4 and 5-6
3XF3		Same as 3XF1	5-4 and 5-6

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